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Full contents | Subscribe
Enlarge current cover
Past issues/regional covers

NEWS ANALYSIS
POLITICS THIS WEEK
BUSINESS THIS WEEK

OPINION
Leaders
Letters to the editor
Blogs
Columns
Kallery

WORLD
United States
The Americas
Asia
Middle East & Africa
Europe
Britain
International
Country Briefings Go
Cities Guide Go

SPECIAL REPORTS

BUSINESS
Management
Business Education

FINANCE & ECONOMICS
Economics Focus
Economics A-Z

SCIENCE & TECHNOLOGY
Technology Quarterly

BOOKS & ARTS
Style Guide

PEOPLE
Obituary

MARKETS & DATA
Weekly Indicators
Currencies
Big Mac Index
Chart Gallery

DIVERSIONS
Correspondent's Diary

RESEARCH TOOLS

AUDIO

DELIVERY OPTIONS
E-mail Newsletters
Mobile Edition
RSS Feeds
Screensaver

CLASSIFIED ADS

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The project and the people
Read more :
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Will Britain's PM ever
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Read more :
Bad news for Cameron
A by-election disaster
Fri, 20 Jul 2007 09:19:
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Print Edition June 23rd 2001

Caught in the jaws
Recession, not inflation, is the biggest risk for the global economy ... More on this week's lead article EE

Previous print editions
Jun 16th 2001
Jun 9th 2001
Jun 2nd 2001
May 26th 2001
May 19th 2001
More print editions and covers »

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The world this week
Business this week EE
Politics this week EE

Leaders
The world economy
Caught in the jaws EE

Antitrust
Merger muddle EE

Enterprise in Britain
The man who would make you rich EE

Argentina's economy
Cavallo's latest gamble EE

Russia and America
Doing the normal thing EE

Summits
More tomatoes, please EE

Letters
On Jenna Bush, Britain's imperial past, David Blunkett, Nigeria, Britain and Europe, container ships, Russia, Kazakhstan, Margaret Thatcher, France, language, Letter from the Editor EE

Special Report
The right to good ideas EE

United States
The economy
Will Bush fight for free trade? EE

Dealing with Russia
Pawn to king four EE

The first referendum on Mr Bush
Passed EE

Lexington
Hillary, you won the war EE

New York politics
Hooray for Herman EE

The next global city?
The blob that ate east Texas EE

California's electricity crisis
A turning point, maybe EE

The Americas
Environment and development (1)
Oil and cloud-forests don't mix EE

Guatemala
"Be careful, very careful" EE

Cuba
Rafting season EE

Environment and development (2)
Mining a sour vein in Peru EE

Asia
Thailand
Thaksin gets his day in court EE

Pakistan
Prez Pervez EE

Nepal's economy
In mourning EE

China and Cambodia
Bearers of gifts EE

China's prisons
Some better, most still awful EE

Japan's economy
The politics of pain EE

Improve your vision

Europe
Ex-communist Europe
Is democracy working? EE

Hungary's next government
A second term for Orban? EE

Caviare
None left for the general EE

Charlemagne
Jack Lang EE

The EU summit
Cheap date EE

Riots at the EU summit
Visigothenburgers EE

Immigration into Germany
More needed, fewer wanted EE

Britain
British productivity
Hunting the snark EE

Prostitution
SoHopeless EE

Missionaries
Green and pagan land EE

Art
Sell pickled sheep; buy portraits EE

Bagehot
The deal EE

Conservative leadership
The form EE

Independent Insurance
Not my fault EE

Waterstone's
Cooking the books EE

Regional spending
The cash of the north EE

Salmon farming
Sewage with your salmon, sir? EE

Articles flagged with this icon are printed only in the British edition of *The Economist*

International
Rioting in Algeria
The swelling anger of Algerians EE

Iran's parliament
Reform, but only as largesse EE

Rwanda's militiamen
Coming home to fight EE

Syria and Lebanon
Goodbye to Beirut EE

Congo and its neighbours
Peace here means war elsewhere EE

Jordan and its Palestinians

Advertisement

Fed up with gravy trains, salami tactics and upsetting the apple cart?

Technology Quarterly
OPINION
Invention is the easy bit EE

LAST WORD
Godfather of the Pill EE

MONITOR
The smaller the better EE

MONITOR
Speed reading EE

MONITOR
Spotting the potholes EE

MONITOR
Put on a coat EE

MONITOR
Powered paper EE

MONITOR
The sound of shuffling EE

MONITOR
Extreme measures EE

MONITOR
Marching on its stomach EE

TEAM SPIRIT
Of high priests and pragmatists EE

REPORT: COMPUTER NETWORKS
Computing power on tap EE

REPORT: COMPUTER NETWORKS
Profit from peer-to-peer EE

REPORT: PORTABLE POWER
Batteries not included EE

REPORT: TRANSPORT
Beyond cruise control EE

REPORT
Sleeping policemen EE

REPORT
Look, no hands EE

REPORT: BIO-ENGINEERING
The new organ-grinders EE

INTELLECTUAL PROPERTY
Patently absurd? EE

MONITOR
Reality check for video-on-demand EE

Business
E-strategy brief: Valeo
Less than the sum of its parts EE

Corporate profits
Where did all the money go? EE

Microsoft and AOL
From friends to foes EE

Selling petrol in China
Pump action EE

Face value
A Slavic sun king EE

Swissair's woes
Not quite Nestlé EE

GE/Honeywell
Welch squelched EE

High-speed Internet access
Broadband blues EE

Airbus
Place your bets EE

Finance & Economics
Argentina
The last tango? EE

Money laundering
Fighting the dirt EE

Auditing
Andersen's fairy tales EE

Economics focus
Saved! EE

Investment banking in Italy
Mediobanca on the back foot EE

Japan's post office
Reformable? EE

World economy
Stagflation? EE

Science & Technology
Quantum cryptography
The end of the code war? EE

Post traumatic stress disorder
At the back of the mind EE

Massive neutrinos
Lost and found EE

Non-quantum cryptography
Forever secret EE

Books & Arts
Generals and politicians
Whose not to reason why? EE

Blacks in the American forces
Double V for victory EE

Contemporary art
Take your trainers EE

First novels
Gay hussars EE

The media economy
Something will come of nothing EE

New poetry
Trust in words EE

Obituary
Victor Paz Estenssoro EE

Economic and Financial Indicators
Overview EE

Output, demand and jobs EE

Prices and wages EE

Income by educational attainment EE

Commercial-property prices EE

Commodity price index EE

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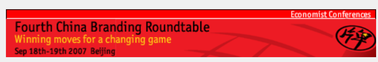

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Business this week

Jun 21st 2001
From The Economist print edition

Not quite devalued

Domingo Cavallo, **Argentina**'s economy minister, announced a set of measures, including subsidies for exports and tariffs on imports, that will have a similar effect to a devaluation. The fixed link between Argentina's currency, the peso, and the dollar has hampered domestic firms. But markets were unimpressed: bond yields rose.

See article: Cavallo's latest gamble

Euro-area inflation rose to 3.4% in the year to May, significantly above the European Central Bank's 2% ceiling. **America**'s consumer-price inflation hit 3.6%. The ECB left interest rates unchanged.

See article: Stagflation?

Line breaks up

Microsoft and **AOL Time Warner** broke off talks about including America Online's software in a new version of Microsoft's Windows operating system. AOL claimed that Microsoft was unwilling to have RealPlayer, AOL's streaming music and video software, competing with its own system, Media Player. Microsoft insisted that broader issues were involved.

See article: From friends to foes

Nortel Networks, a large Canadian telecoms-equipment firm, confirming that the telecoms business was in terrible shape, said that its losses in the current quarter would exceed $19 billion. The company said that it would lay off 10,000 workers in addition to 20,000 job cuts that it had previously announced.

British Telecom announced that 90% of a £5.9 billion ($8.2 billion) rights issue had been taken up, despite speculation that investors would be reluctant to acquire more BT shares even at a heavily discounted price. The company will use the cash to pay off part of its £30 billion debt.

Against most expectations, **Iran**'s supreme leader, Ayatollah Ali Khamenei, ruled that parliament could investigate the state television and radio monopoly.

Oracle, an American software company, bucked the downward trend in the technology sector. It announced profits for the latest quarter of $855m, beating analysts' expectations. But **Infineon**, Europe's second-largest chip maker, said that it would make a pre-tax loss in the quarter of *euro*600m ($525m), worse than the most pessimistic predictions. The German company's shares slumped.

Marconi, a British telecoms-equipment maker, reacted to its shares hitting a near-six-year low by reducing the strike price of share options for its executives. Hard-hit shareholders were less than impressed.

Meat market

America's **Tyson Foods**, the world's biggest chicken company, renewed its interest in **IBP**, a leader in beef and pork, after a court ruled that it should not have broken off a $3.2 billion merger last year. Tyson reckoned that a merger to create a meat-processing behemoth would beat paying compensation.

EPA

DaimlerChrysler unveiled plans to cut investment at Chrysler, its loss-making American arm, by 40% over the next five years to save around $18 billion. The company insisted that efficiency would improve and products would not suffer.

General Electric's planned takeover of **Honeywell**, already approved by America's regulators, seemed likely to be scuppered by the European Commission. Jack Welch, GE's boss, had delayed his retirement to see the deal through, but has seen market conditions worsen since the bid was made.

See article: Welch squelched

Net profits at **Lehman Brothers**, an American investment bank, in the latest quarter were up by 14% compared with a year ago, to $430m. Its bond-underwriting business has prospered. **Goldman Sachs** said that net profits were down by 24% to $577m after a slowdown of merger and acquisition activity and initial public offerings.

Law and order

Andersen, one of the "Big Five" accountants, agreed to pay a $7m fine imposed by America's Securities and Exchange Commission to settle a case of auditing fraud. Waste Management, a firm audited by Andersen, had overstated profits by $1.4 billion between 1992 and 1996.

See article: Andersen's fairy tales

The Federal Energy Regulatory Commission announced that it would cap wholesale electricity prices in **California** at all times, rather than just during power emergencies. It also extended electricity-price controls to ten other western states. The move fell short of even tougher controls favoured by Gray Davis, California's governor.

See article: A turning point, maybe

Despite talks with the prime minister, **France**'s employers' club, Medef, said that from the end of July it would cease to take part in running the social-security system with the trade unions and the government. It objects to the government's plan to use social-security funds to help pay for France's shorter, 35-hour working week.

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Politics this week

Jun 21st 2001
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Arms race revisited?

Fresh from meeting George Bush and being told that the United States would build its national missile defence scheme whether **Russia** liked it or not, President Vladimir Putin said that, if so, his country would increase its nuclear power "many times over" by putting multiple warheads on its missiles.

See article: Doing the normal thing

A former foreign minister of **France**, Roland Dumas, found guilty of corruption in the Elf affair in President François Mitterrand's day, claimed two of today's ministers, including Hubert Védrine, the foreign minister, had known full well what was going on.

The patchy truce between **Israel and the Palestinians** continued, though both sides blamed the other for not sticking to the bargain. Colin Powell, America's secretary of state, will be returning to the region. Israel reacted angrily to a BBC documentary about the possibility that Ariel Sharon, Israel's prime minister, might be charged with war crimes for his indirect responsibility for the massacre of Palestinian refugees in 1982.

After riots at the **European Union**'s summit and meeting with George Bush in Sweden, the Italian city of Genoa prepared gloomily to hold a G8 summit in July. Try a ship instead, suggested some.

See article: More tomatoes, please

AP

Collateral damage

Iraq claimed that 23 people had been killed when American and British aircraft patrolling Iraq's northern no-fly zone bombed land near Mosul that was used as a football pitch. The Americans and the British deny the incident.

Police shot dead 13 people in **India** when a mob set fire to the state assembly building in Imphal, the capital of Manipur. The rioters were protesting against the Delhi government's truce with Naga separatists in the state.

Frustrating the **Algerian** regime's divide-and-rule tactics, protests that started in the Berber-speaking region spread to other areas.

See article: The swelling anger of Algerians

A bomb in an office of **Bangladesh**'s ruling Awami League killed 22 people. It was the biggest of a series of blasts that have killed about 100 people in the past two years. The opposition Bangladesh National Party denied involvement in the attack.

Patients are a virtue

The United States Senate plunged into a dispute over a **patients' bill of rights**. Arguing that it would raise health-care costs, Republicans delayed action on the bill. The Democrats say they will keep the Senate in session beyond its July 4th recess to pass it.

See article: Hillary, you won the war

NATO said that, if there were a peace deal in **Macedonia**, it would send up to 5,000 troops empowered, among other things, to collect weapons surrendered by ethnic-Albanian guerrillas.

An appeal court in **California** upheld a homeless man's 25-year prison sentence for stealing four biscuits. The man, jailed under California's "three strikes and you're out" policy, was said by the court to be a career criminal.

Prosecutors agreed to charge **Spain**'s foreign minister, Josep Pique, over alleged frauds in a sale to Elf by Ercros, a Spanish firm of which he was once a director. The attorney-general can overturn the decision.

Reuters

Eight days after dispatching Timothy McVeigh, the United States carried out its second **federal execution**. Unlike McVeigh, Juan Raul Garza, a drug trafficker and murderer, had apologised for his crimes.

The United States Justice Department said it would try to settle a long-running civil lawsuit against the **tobacco industry** that was filed in 1999 in an attempt to recover billions of dollars spent on tobacco-related illnesses.

Popular king

In **Bulgaria**'s general election, a movement headed by ex-King Simeon II won half of the 240 seats in parliament. An ethnic-Turkish party said it was ready to join a coalition. It is unclear whether Simeon will become prime minister, seek the presidency in the autumn or call the shots from behind the scenes.

Reuters

See article: Is democracy working?

After Tony Blair's post-electoral reshaping of **Britain**'s administration, his chancellor of the exchequer (finance minister), Gordon Brown, announced new measures to bash cartels, encourage entrepreneurs and speed up land-use planning decisions. No, the relevant ministries have not been abolished.

See article: The man who would make you rich

A vote of no confidence ended the long Christian Democrat domination of **Berlin**'s city government. A Social Democrat-Green coalition will run Berlin until a fresh election is held, probably in September.

General Pervez Musharraf, who seized power from **Pakistan**'s elected government in October 1999, had himself sworn in as president. One motive, it was thought, was to give him additional stature for his meeting with the Indian prime minister on July 14th.

AP

See article: Prez Pervez

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The world economy

Caught in the jaws

Jun 21st 2001
From The Economist print edition

Recession, not inflation, is the biggest risk for the global economy

THE world economy is starting to look remarkably, even dangerously, vulnerable. America's growth seems to have fallen close to zero in the current quarter. Japan has almost certainly slipped into another recession. And although the euro area is still growing, its pace has slowed more sharply than expected. Worse, a nasty complication has emerged: just as growth has slumped, average inflation in the big rich countries has gone up to its fastest rate for almost eight years, kindling fears that stagflation, the disease that spread around the globe in the 1970s, may return. If it did, the task of central banks would be a lot tougher: rising inflation would cramp central banks' room to cut interest rates to ward off recession, and could even force them to raise rates. But fears of inflation are exaggerated. Recession remains by far the bigger risk.

Over the past couple of decades, a slump in the United States has usually been offset by a boom in Japan or Western Europe. It is alarming, therefore, that the three big economies should now all be slipping at the same time. Moody's estimates that, in the three months ending May, the total industrial output of America, the EU and Japan fell by 0.5% on a year earlier, compared with annual growth of more than 6% the previous year. This is the sharpest-ever dive for industrial growth rates within a 12-month span.

If (a big if) consumer spending remains resilient, America's economy may yet escape a recession, defined as two consecutive quarters of falling GDP, but the risk of one remains high. Industrial production fell in May for the eighth straight month. Earlier hopes of a strong recovery in the second half of this year are now fading. The slump in corporate profits and investment (see article) suggests worse news to come. Initial jobless claims, the most timely measure of labour-market conditions, have risen at an annual rate of 50% over the past six months, a pace that in the past has been seen only in recessions. Yet American inflation also rose in May, to 3.6%, and the bond market is betting it will rise further. Long-term bond yields seem to have been driven up by fears that the Federal Reserve's interest-rate cuts may have gone too far.

Meanwhile, Japan's GDP unexpectedly fell in the first quarter of this year, and the current quarter may prove weaker still. Inflation, on the other hand, is certainly not Japan's problem. On the contrary, it is suffering from an even deadlier complaint: deflation, which swells the country's huge real debt burden and further discourages spending. By comparison, the euro area looks relatively healthy. But for how long? The recent slide in industrial production suggests that GDP growth in the euro area has slipped below its long-term potential rate of around 2.5%. Awkwardly, though, consumer-price inflation in the euro area too has jumped, to 3.4% in May, well above the 2% upper limit of the European Central Bank's inflation target.

Does that mean the ECB should continue to hold off from cutting interest rates? No. If growth in Europe has fallen below potential, it should cut them again. Nor should the Fed be put off by higher inflation (or by the views of the bond market) when it holds its next policy meeting on June 26th-27th (see article). It would be right, rather, to keep cutting rates.

The return of stagflation may make catchy headlines, but today's situation is not like the 1970s, when a jump in oil prices pushed inflation to double-digit levels. Average inflation in big rich countries was still less than 3% in May. They have not entered a recession with such low inflation since 1960. The pick-up in inflation may indeed complicate the task of central bankers, but it has not been anywhere near big enough to stop further interest-rate cuts if output continues to falter.

A lot of hot air about inflation

One reason not to fret unduly about the recent rise in inflation is that most of the increase has been due

to higher prices of energy and, in Europe, to higher food costs as a result of BSE and foot-and-mouth disease. So far, such rises have not fed through significantly into other markets. The core rate of inflation, excluding food and energy, has risen, but it stands at a more modest 2.5% in America and 2.1% in the euro area.

Second, inflation is a lagging indicator, which usually continues to rise through the early stages of recession and then falls as more slack is created. Because of lags in the operation of monetary policy, central banks have to think about future, rather than current inflation. The good news is that, unless energy prices continue to soar, which looks unlikely, inflation in both America and Europe is likely to fall over the next year. That is why the ECB was right to cut interest rates by a quarter-point in May, to 4.5%, despite rising inflation. It also means that it is safe for it to cut rates again this summer.

Fears that the Fed's rate cuts this year have been too aggressive are equally flawed. According to an index calculated by Goldman Sachs, overall financial conditions in America have hardly eased at all this year. The cuts in short-term interest rates have been almost entirely offset by higher bond yields, a stronger dollar and lower share prices. That means that any economic recovery (and hence inflationary pressures) is likely to be weaker than generally expected.

Another reason why inflationary pressures should remain subdued in America is that overinvestment during the bubble era has left lots of excess capacity. Firms lack pricing power, so a jump in the costs of energy or labour will tend to squeeze profits rather than spur inflation. Falling profits will then force firms to cut other costs—jobs as well as capital spending—which will further reinforce the slowdown. Global capacity utilisation is close to a 15-year low. In such an environment, lower interest rates are less likely to push up inflation.

Inflation will become a problem only if economies rebound strongly. As labour and product markets grew tighter, the Fed might then have to raise interest rates. But that would not matter if the economy were motoring along briskly. So long as the economy remains weak, inflationary pressures should subside on their own. Because of lags in monetary policy, there is always a risk that central banks end up easing too much, nudging up future inflation. But that risk remains small compared with the potential cost of a deep world recession.

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Antitrust

Merger muddle

Jun 21st 2001
From The Economist print edition

The EU is entitled to veto the GE/Honeywell merger—but its procedures need improvement

JACK WELCH summed up the mood. America's most famous, and most admired, chief executive had postponed his retirement from General Electric to shepherd through its planned $42 billion takeover of Honeywell, which was to have been the world's biggest-ever industrial merger. Last week he called the conditions that the European Commission is seeking to impose in exchange for approving the deal "extraordinary", and went on to declare that "you are never too old to be surprised." Yet despite (perhaps, indeed, partly because of) his outburst, the commission looks certain, barring some sudden change of heart, to veto the merger early next month.

AP

Mr Welch's outrage is widely shared. What gives Europeans the right to block an all-American merger that was approved by America's own antitrust authorities with only minor changes? GE was quick to detect politics at work: a desire to protect Europe's own aero-engine maker, Rolls-Royce, maybe, or its civil-jet maker, Airbus. Several commentators recalled the commission's threat to block Boeing's takeover of McDonnell Douglas in 1997, which was also said to be motivated by Airbus's interests. President Bush expressed concern about a European rejection of the GE/Honeywell merger; other American politicians even muttered about retaliation.

Such reactions are way over the top. A merger as big as this is global in effect: it is entirely reasonable that different antitrust authorities should investigate it. It is less understandable that they should reach markedly different verdicts, but it has happened before. Last year the Americans stopped the all-European Air Liquide/Air Products takeover of BOC even though the Europeans had approved it. And the Europeans blocked the all-American takeover of Sprint by WorldCom (though that time the Americans too were opposed).

Differences remain mercifully rare. Since the Boeing/McDonnell case, the European Commission and the American antitrust authorities have improved and formalised their links. They now talk extensively and often agree which side should take the lead role. Both sides have explored the idea of a global competition forum, which may become more necessary as other countries' regulators muscle in—though the notion of a world competition authority seems premature.

The GE case does, however, give grounds for concern over the handling of big global mergers. One is that the Europeans and the Americans, as the two principal authorities involved, may be following diverging paths. Under Mario Monti, the competition commissioner, the EU is strengthening its antitrust enforcement by enlarging such concepts as "collective dominance". The new Bush administration, by contrast, appears to be weakening antitrust enforcement, for example over Microsoft. That divergence could lead to more clashes.

In the specific instance of GE/Honeywell, the commission was justified in voicing some objections, and the Americans may have let the deal through too easily. But parts of the commission's economic analysis, especially its attack on the "bundling" of different products to undercut rivals, look suspect, and its habit of shifting ground during the investigation was dubious (see article). It also seems to have relied more on claims made by GE's competitors than on evidence of harm to consumers. Even so, better negotiating tactics might have rescued the deal. This week, Mr Monti suggested that the gap between the two sides was smaller than GE was claiming. It is hard not to conclude that some inside GE may be secretly relieved that the merger looks like falling through.

A better procedure

The most desirable outcome of this case would, however, be a thorough rethink of Europe's merger regime. Since the commission's merger task-force came into being a decade ago, it has mostly done its work well, although it remains under-resourced. The process is commendably transparent. It is also welcome that it observes a tight timetable, since many past mergers have been undone by regulatory delay.

The biggest defect is that the commission acts as prosecutor, judge and jury. An appeal can be made to the European Court of Justice, but that involves huge delays: the attempt by Airtours to overturn the commission's rejection in September 1999 of its merger with FirstChoice, on grounds of collective dominance, is still pending. In America, the Department of Justice or the Federal Trade Commission have to go to court to block a merger. The commission has tried to balance its procedures by appointing a "hearing officer" charged with ensuring that companies get a fair hearing, but there is a huge difference between an internal and an external check.

One obvious solution would be to expedite the appeal procedure in the European Court. A second good plan would be to take competition away from the commission altogether and give it to a wholly independent body, free of political influence. An even more radical third idea would be to change the rules to force such a body, like its American counterparts, to go to court to block a merger. If the acquisition of Honeywell is not to be Mr Welch's last big achievement, reforms to Europe's merger regime would be a fine alternative.

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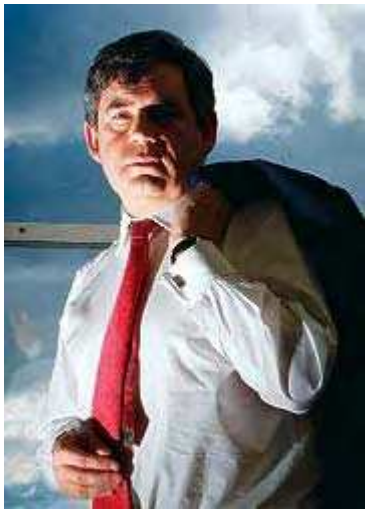
Enterprise in Britain

The man who would make you rich

Jun 21st 2001
From The Economist print edition

Gordon Brown's plans to free business would be more convincing if he weren't such a meddler

Murdo MacLeod



WITHIN days of the 1997 election, Gordon Brown, Britain's chancellor of the exchequer, announced that he was setting the Bank of England free by granting it independence from government. Within days of the 2001 election, Mr Brown announced a package of measures to set business free by promoting enterprise and fairer competition. He clearly relishes the post-election spotlight.

This week's event was billed by Labour's spinners as just as significant as the previous one. In the same way as Mr Brown had revolutionised the conduct of monetary policy, so he would improve the competitive environment and thus allow Britain to vault back up the productivity league that it has been slipping down for most of the past century. But there's an obstacle to fulfilling this laudable goal. It is called Gordon Brown: some of the barriers to enterprise today were imposed by this meddlesome chancellor in his first term of office.

Stopping the slide of British productivity has been a common theme among Mr Brown's predecessors, ever since 1945. That didn't stop Britain from falling behind European countries as they caught up with America. In the past twenty years that slide down the productivity league has ceased. But a sizeable gap remains with other leading countries, including not just America but France and Germany. And in the past five years, productivity growth unexpectedly faltered in Britain while it stormed ahead in America (see article).

The American and European models offer different ways of achieving higher productivity. America's relatively unregulated economy makes it easy for businessmen to start up companies, and fail, and start again. Europe's rich countries invest more heavily than Britain in training people and, especially, in machinery. Britain's government has already announced that it will be spending a higher proportion of GDP on education, to try to match Europe's superior workforce. Now Mr Brown has unveiled an American-style agenda "to create in Britain a true enterprise culture not confined to few but open to all."

A land fit for heroes

That is a fine aim. Mr Brown says he will achieve it by making business less cosy and more competitive. A crackdown on price-fixing cartels—including a headline-grabbing proposal to jail offending executives—forms part of a set of reforms which will enhance the competition authorities' powers so that they can mount more effective investigations into the dominance of some markets by a few big firms. Those changes would make Britain's competition regime the harshest in Europe, much to the ire of big business. Yet given the benefits that fierce, open competition have brought to America, that label would be no term of insult.

Secondly, Mr Brown wants to make Britain a land fit for that hero of modern times, the entrepreneur. He wants the British to emulate the get-up-and-go spirit that makes Americans three times more likely to try to start a business. He hopes to do that by reducing tax rates on small businesses and by providing seed money to new regional venture capital funds. And he wants to take the pro-enterprise message into schools, with children learning more about business and entrepreneurship.

Laudable though these efforts are, however, the likely benefits need to be kept in proportion. The best competition regime in the world—Mr Brown's aspiration—cannot itself conjure up effective competitors. Opening up the economy to international trade and inward investment has a bigger effect in stimulating

activity and forcing firms to be efficient. But much of it has already been done.

For that reason, a beefed-up competition regime will help, but only at the margin. Its principal role should be to ensure that Britain's active market in mergers and takeovers—which keep managers on their toes—is not abused by acquisitive companies seeking to dominate their bit of the economy. If greater price competition and trade were the goals, then joining the euro could surely have been another way to promote business activity and productivity in Britain. But Mr Brown, who this week called himself a "pro-euro realist", will have been less keen on using that as his post-election surprise.

Yin, yang and Gordon

Equally, few could argue with the goal of encouraging enterprise. But here is where Mr Brown is himself part of the problem, rather than the solution. The best way to get people to take the plunge is to put as few obstacles in their way and to ensure that they get rewarded when they succeed. Instead, the chancellor's approach is to try to stimulate enterprise directly, with an array of tax-breaks and seed money. Yet businesses, big or small, succeed by concentrating their efforts on their markets and their products, not by combing Whitehall directives for marginally helpful measures.

Mr Brown's new micro-measures may help a bit. But if so it will largely be because they reform unhelpful ones—such as an over-complicated capital-gains-tax regime—which the chancellor himself introduced in Labour's first term. Small firms will wait with interest to see whether a review of payroll services will really relieve some of the compliance burden of organising new schemes like the working families' tax credit.

There is other meddling too. The new package of measures includes more fiddling with tax breaks on share options for small, higher-risk companies. If small businesses have hated administering the working families' tax credit—directed at low-paid workers with children—how will they take to the employment tax credit which replaces it in 2003 for all eligible adult workers? And where Mr Brown is not imposing his own social agenda, the government is implementing new rules that come from Europe, such as the directive on worker consultation which has infuriated employers' organisations.

The chancellor is a master of balancing the yin and the yang of Labour's third-way politics. But while creative tension can prove productive, contradictions are plain contradictory. Mr Brown will have to decide whether he really wants an American-style entrepreneurial culture, or whether he wants to be a European micro-manager. He can't have it both ways.

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Argentina's economy

Cavallo's latest gamble

Jun 21st 2001
From The Economist print edition

The decision to create a back-door dual exchange rate could cost Argentina dearly

Get article background

DOMINGO CAVALLO is a clever man, but he is now clutching at straws. Argentina's currency board precludes devaluation and puts monetary policy off limits. The country's debt burden, although temporarily alleviated by a recent $29 billion bond swap, leaves no room for looser fiscal policy. So, to get the country moving again after three years in the doldrums, the new, all-powerful economy minister has been tinkering with an unorthodox combination of subsidies, tariffs and tax changes designed to improve the competitiveness of domestic firms. Unfortunately, his latest decision—to mimic a devaluation by offering exporters a subsidy and importers a tariff (see article)—may be a step too far.

On paper, his plan is ingenious. In the long term, Mr Cavallo wants the peso, pegged at parity with the dollar for the past decade, to be tied to a basket made up of the dollar and euro. But to avoid a devaluation, and the chaos (and defaults) such a move could imply in a country where most debts are in dollars, this shift will take place only when the euro reaches parity with the dollar. So instead, under the new policy, exporters will get a subsidy and importers pay a tariff to make up the difference between today's dollar rate and a hypothetical peg based on the euro and the dollar. That difference is now around 7%. In effect, Argentina's beleaguered exporters will benefit from the equivalent of a small devaluation, but the country will avoid the cost of a real drop in the currency. What is more, the government claims that it will collect some cash, as tariff revenues should be higher than export subsidies.

Unfortunately, such schemes that are clever in theory often turn out to be an utter mess. Dual exchange rates, which are what Mr Cavallo has in effect created, are notoriously inefficient and prone to abuse. Exporters now have an incentive to exaggerate their sales so as to reap a bigger subsidy. Worse still, Mr Cavallo has confirmed the impression that the rigid exchange-rate peg between the peso and the dollar, which he introduced in 1991 and which has for a decade been the keystone of Argentina's economic policy, is no longer sacrosanct.

Thus, technically, Argentina has not devalued. And, technically, it has not introduced a dual exchange rate. But to many investors, this scheme looks and smells as if it has done both. Worse, they do not know what gimmick Mr Cavallo might produce next. That is why yields on Argentina's debt have risen sharply. The painful truth is that in an economy in which exports are small but the external debt is huge, the benefits of a small quasi-devaluation for trade are easily outweighed if nervous investors send interest rates higher.

Argentina is in a tough spot. For three years, it has been buffeted by low commodity prices, a strong dollar and a sharp fall in Brazil's currency, as well as the general nervousness over emerging markets. Despite the recent debt swap, the spectre of default will soon loom once more if the economy does not grow. Structural reforms, including further rationalisation of the public sector and reform of the labour market, should raise growth eventually, but they are politically challenging and slow to take effect. The temptation to try quick fixes is clear. But the sad irony of Mr Cavallo's appetite for them is that he is undermining the transparency and predictability that were the essential strengths of the rule-based currency-board system that he himself created. If he continues in this direction, the man once hailed as the saviour of a desperate economy may turn out to be the one who finally sinks it.

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Russia and America

Doing the normal thing

Jun 21st 2001
From The Economist print edition

Can George Bush and Vladimir Putin agree to disagree constructively?

AP

SOULMATES they are not, for all the backslapping bonhomie of last weekend's first meeting between George Bush and Vladimir Putin. America's new president needed to reassure critics that he was not spoiling for an unnecessary fight with Russia. Mr Putin was keen to dispel the notion that Russia was too set in its old ways of thinking to be worth a serious chin-wag with the leader of the world's pre-eminent power. But there is more at stake for both in the American-Russian relationship than that, especially for Russia.

If Mr Putin is as clear-eyed about Russia's "national interest" as he likes to claim, he will move to explore the common ground with America and the West—in security matters, as in diplomacy and trade—not just harp on the obvious differences. America and Russia are no longer enemies, as Mr Bush points out. More than that, Russia has much to gain from deeper political and economic engagement with the West.

But that is easier for an American president to offer than for Mr Putin to accept. Still smarting from Russia's loss of empire and influence in the post-cold-war world, his officials act as if any apparent gain for America and its friends must mean a loss somehow for Russia. Fresh thinking would help deal with testy issues on the agenda, from the Balkans to missile defences, from non-proliferation to NATO enlargement. Is Mr Putin ready for the "normal" relationship Mr Bush is offering?

Normal countries can disagree—look at America's disputes with some of its allies in Europe. And though Russia's relations with America should be based on more than an obsession with rockets, the search for a new strategic understanding is a place to start. Nuclear missiles are one of Russia's few remaining claims to parity with America. Rightly or wrongly, limited defences, not against Russia, but against smaller threats from rogue regimes, are one of Mr Bush's priorities.

Russia has no veto over America's defences. But it does have a legitimate interest in Mr Bush's missile-defence plans, since they would break the two countries' Anti-Ballistic Missile (ABM) treaty, which, to preserve strategic stability in more hostile times, sharply limits the sorts of defences either can deploy. After months of stonewalling, Mr Putin has now signalled an interest in exploring America's offer of some sort of new strategic bargain (see article). Its elements could be to cut both sides' unwieldy arsenals down to more affordable size, as Russia wants, while trying for a new set of stability-preserving understandings that leave America the room to explore limited defences against smaller, but less predictable threats. For both, such a deal is worth a serious try.

But will Russia negotiate in good faith? Unlike China, Mr Putin accepts there is a new threat. But his preferred solution—diplomacy, plus regional defences—sounds disingenuous to western (and not just American) ears. Although the spread of increasingly long-range missiles and the technologies of mass destruction to the Middle East, the Gulf and Asia threatens Russia's safety too, Russian companies do more than most (apart from China's and North Korea's) to help the would-be proliferators, including Iran, Iraq, Syria and others. Russia's government recently broke the rules by selling nuclear fuel to India, which refuses full safeguards on its nuclear industry. If Mr Putin wants his missile-defence concerns taken seriously by America, he would do well to stem this dangerous flow of materials and know-how.

Why does Russia sell these things? The shortest answer is cash. Its feeble economy is hostage to the oscillating price of oil and other raw materials, and it has little else to trade. Money also explains why Russia sells its newest conventional weapons to places like China and Iran that could one day be a threat to its own interests, and are already a threat to others. Making such mischief is also Mr Putin's way of

disguising Russia's decline. But it is no way to reverse it. Only economic reforms and stronger democratic institutions can do that.

That image problem, again

But the clash between Russia's short-term resentments and long-term interests does its most immediate damage in Europe. Russia has signed all the codes and rules of the Organisation for Security and Co-operation in Europe and the Council of Europe, yet routinely breaks them—in its brutal war in Chechnya and in its long-standing support for Slobodan Milosevic as he brutalised the Balkans. It harasses weaker neighbours, such as Georgia and Moldova. It resents the westward ambitions of the Baltic states, and does its best to frustrate reformist forces in Ukraine.

Mr Putin wants Russia to be a power in Europe, but his Europe is one of old-fashioned spheres of influence, with one sphere for Russia. Hence the lengthening queue of countries eager to join the European Union and, to Russia's dismay, NATO. Offering a hand of reconciliation to these countries, rather than a resentful fist, would do more than anything to establish Mr Putin's credentials in both America and Europe as a man to do normal business with.

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Summits

More tomatoes, please

Jun 21st 2001
From The Economist print edition

Why the protesters are playing into the hands of global capitalism

IT'S tough being a world leader these days. Once upon a time, you could meet a couple of your counterparts in some pleasant seaside town, forge a union or divide a continent over dinner, and then issue a grateful public with a photograph and a communiqué for them to stick in their history books. It's just not like that any more. Wherever you go, now, thousands of ungrateful yobs turn up, slinging bricks at the police and sound-bites at the cameras, and generally detracting from the seriousness of the proceedings. So how is anybody to have a quiet pow-wow these days?

Employ a more imaginative locations manager, possibly. Most summits take place in such conventionally cushy places. The glamorous names that punctuate the history of summitry—Versailles, Yalta, Potsdam, Rome, Nice—betray the weaknesses of summiteers for sun, sea, sand and palaces. Even Seattle and Gothenburg have a low-key marine charm as well as a reputation as hippy heaven. Advertising a summit in that sort of place is pure provocation to a bored anarchist in a bedsit in south London.

The world is full of alternative locations guaranteed to discourage the soft-bellied young of today. There are style-free places, such as Margate or Ostend. There are downright depressing places, such as Minsk or Karlsruhe. Those far-sighted folk at the World Trade Organisation have already taken the hint, by holding their summit this November in Qatar, which most anarchists will think is a throat problem. But there are also seriously nasty places, such as Lagos, where a recent government campaign to promote tourism was greeted with howls of laughter by the locals. No self-respecting anti-capitalist would be seen dead in that sort of dump (for an alternative view, however, see Letters). For summiteers, Lagos might have a few minor disadvantages, such as filth, crime, a horrible climate and a shortage of hotels with proper plumbing, but those are not the sorts of things to put off a statesman determined to forge a better future for the planet.

If they are unwilling to relocate, the summiteers can always look on the bright side. The organisations that are the focus of the anarchists' anger—the World Trade Organisation, the International Monetary Fund, the World Bank and the European Union—have long shared a common problem. Nobody (aside from a few eccentric publications, such as this one) wanted to write about them. Nobody wanted to hear about them. Mention of their names was enough to kill conversation.

The protesters have changed all that. Front pages are spattered with stories about these organisations. Columnists fulminate about their activities. Ideology has infused economics, for the first time since Karl Marx wrote (and nobody read) "Das Kapital". The dismal science is suddenly sexy. Even more shocking, so are multilateral institutions (try putting that into a protest song). People who used to be regarded as pen-pushing bureaucrats have become warriors in the struggle between the forces of global capital and the forces of something-or-other. The protesters, in other words, have done what the public relations departments of the WTO, the IMF, the World Bank and the EU have failed to do in half a century: they have made economics exciting.

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Letters

Jun 21st 2001
From The Economist print edition

The Economist, 25 St James's Street, London SW1A 1HG
FAX: 020 7839 2968 E-MAIL: letters@economist.com

Sins and daughters

SIR – America suffers from “a pathological obsession with safety” because we foster such a monstrously litigious society (“Free Jenna!”, June 9th). There is a significant industry reaping profit through blame. There can be few faultless “accidents” any more.

The parental hand-holding role of government and business is a self-perpetuating liability. To the toner-cartridge company that warns its customers not to eat the contents add the fast-food chain that prints “Caution—contents hot!” on its coffee cup, the school that disallows playground games, the firm that forbids lunchtime drinking or the garage that bans risqué pin-up calendars. They are not protecting the consumer or employee but protecting themselves.

Laura Denham
San Francisco

SIR – I must take issue with your comparison of Jenna Bush to The Maid of Orleans. Joan was born into what was, at best, a lower-middle-class family; Jenna was born into a wealthy, privileged and powerful dynasty. By the age of 19, Joan had helped reverse the outcome of the Hundred Years’ war, crowned a king, conquered numerous cities, attempted to escape from prison by jumping from a high tower, successfully sparred with learned theological scholars at her trial and bravely died the death of a true martyr. By the same age, Jenna’s main accomplishment has been to try (and fail) to buy booze. Americans may be puritanical but the hapless Jenna does not hold a candle (or a shotglass) to St Joan.

Richard Einhorn
New York

SIR – I cannot agree with your comparison between smoking and drinking. There is nothing illiberal about restrictions on public smoking. If I sit next to a drinker, I am not required to share his beer; if I am one table over from a parachutist, I am not expected to throw myself out of a plane. Smoking, by its nature, is a participatory activity involving those nearby whether they wish it or not.

Christophe Pettus
London

SIR – In the pantheon of silly laws you forget to mention America’s speed limits. Even as highway deaths continue to drop and cars continue to get safer, we are forced to drive more slowly on our roads than any other nation. This is because we seem unable to provide proper driver training and prefer to feed the coffers of police departments with the billions of dollars they raise every year by ticketing the drivers who simply cannot maintain the effort required to drive at 65mph on roads designed to be safe at much higher speeds.

David Ashe
Key Biscayne, Florida

SIR – Although I thoroughly agree with the rant against American puritanism, I find it somewhat ironic that such a spirited argument comes from a newspaper published in a country where finding a drink after the silly 11pm last call is damn near impossible.

J.C. Cocchiarella

London

SIR – I am sure that you are aware that America is the only country in the western world where a woman cannot bare her breasts on the beach without the threat of police action. I look forward to a campaign run by you along the lines of “Free the breast”. You can rely on my support.

Anthony Sweeney
Darien, Connecticut

Britain and Japan

SIR – Britain’s so-called democracy drove two native populations to the brink of extinction in Australia and North America (“A normal country”, May 19th). Neither Hitler nor Hirohito managed this. Britain also executed the opium war—the most shameless in the history of mankind—and behaved as the devil incarnate towards the closest we have to a modern-day saint: Gandhi. Britain has never apologised for these deeds.

I am a leftish Japanese citizen and am dead against the new prime minister, Junichiro Koizumi. Naturally, I am sympathetic to your apprehensions about his nationalistic streak but would you turn a fraction of your critical eye to Britain’s past? This would make your articles on Japan and elsewhere even more persuasive.

Kikuchi Takehiko
Sendai, Japan

Blind ambition

SIR – Bagehot (June 9th) suggests that David Blunkett’s inability to deal with vast amounts of paperwork because of his blindness might prevent him from becoming prime minister. Is it not possible that this has contributed to his success? Rather than being overwhelmed with detail from his department he perhaps has more opportunity to consider the broader picture.

Adrian Coster
Hitchin, Hertfordshire

Holiday in Nigeria

SIR – You paint an unpleasant picture of Nigeria and its largest city, Lagos (“Tourism in Nigeria”, June 9th). After making regular trips to Lagos over the past year, I have to report that the truth is, as usual, more subtle. Theft is endemic at all levels of society, the roads are chaotic, and services such as water, electricity and telephones are generally unavailable.

However, Nigerians are warm, polite, organised and ambitious. There is none of the desolation of the spirit one sees in countries like Angola and Congo. Nigerians have embraced their nascent democracy. Armed police still man roadblocks but no longer demand money. The immigration and customs officials at Lagos’s airport are friendlier and more efficient than anywhere else I have been to in Africa. Lagos can be scary, but no more so than the wrong side of an American city. It is still hard to get a tourist visa but anyone lucky enough to visit Nigeria will find a country filled with optimism and energy and the kind of nightlife that made Kinshasa famous in years gone by. Just leave your credit card at home.

Pieter Hintjens
Brussels

Britain and the euro

SIR – Your leader about the convenience or not of Britain joining the euro is a supreme expression of common sense (“And now for Europe?”, June 9th). It appears that Tony Blair considers it fashionable to be pro-euro but the truth is that no one knows for sure what kind of European Union we will have in five years’ time, particularly after the Irish rejection of the Nice treaty. I think that until Europe adopts a constitutional framework, like the one you proposed last year, Mr Blair should remember the Spanish saying: “it is worth more to be alone than to be in the wrong company” (like Lionel Jospin).

Jorge Payet
Madrid

SIR – Your arguments in favour of delaying a referendum on the euro are inconclusive. First, not enough is known about the assumptions of investors to correlate the high rate of foreign direct investment in Britain in the second half of the 1990s with our being outside the euro zone. It was only in October 1997 that the government said we would not be in the first wave, though it was broadly positive about our joining ultimately.

On the effect of non-membership on Britain's political influence in Brussels, you are easily convinced by Tony Blair's denial. What else would you expect him to say while he holds fire on a referendum? It is true from a constitutional point of view that Britain's legislative rights in Brussels are unaffected but the group of 12 euro-zone finance ministers that meets, so far informally, can form a winning majority on an issue ahead of a vote in Ecofin and sideline Britain.

Common sense suggests that Britain's ability to influence matters in Brussels would be much the stronger for participation in the European Union's most ambitious project to date. It seems perverse to wait until 2004 at the earliest to find that out for sure.

Stephen Quigley
Chairman, European Movement, Sussex Branch
Merston, West Sussex

Losses at sea

SIR – An important benefit of containerisation that you omit from your obituary of Malcolm McLean (June 2nd) was the end of wholesale pilferage. I was at sea for four years from 1942 and stealing by stevedores was rife. The mobs controlled the docks. On a trip to Port Elizabeth the hold contained a shipment of registered United States mail. After the ship cleared port the mate came to me—I was purser—with a cut-open canvas bag. Every bit of mail had gone. Mr McLean's boxes were (and I hope still are) tamperproof.

Gordon Dalton
Pinehurst, North Carolina

Law of diminishing returns

SIR – Russia's legal system is indeed in need of reform ("The path to reform—or another dead end?" June 2nd). But low pay, and widespread corruption and incompetence are traits shared with Russia's police force. An accountable legal system is dependent on the enforcer on the street and Russians have no faith in their policemen. They are thought to be open to bribery, as well as being racist, corrupt and often downright criminal. Without a well-trained police force which is both respected and trusted, the law in Russia will still be selective and justice will not prevail.

George Goss
Prague

Kazakhs and democracy

SIR – Why do you find it newsworthy, much less bizarre, that Kazakhstan's government ruthlessly stifles political opposition, or that most Kazakhs demonstrate little enthusiasm for participatory democracy ("Don't know, don't care in Kazakhstan", June 9th)? The authoritarian clique is understandably determined to keep control and enhance illicit self-enrichment. To sustain this scam with essential hard-currency contributions from western aid donors and foreign investors, it must keep the republic's few courageous activists from gaining public exposure. A media monopoly and brutal intimidation are essential planks of this totalitarian platform.

As for the "passive" citizens, no living Kazakh has ever experienced participatory democracy. Most do not understand its fundamental precepts, local relevance or potential benefits. Nurturing democratic awareness and transition in the face of zealous government resistance will be a slow, determined intrusion. Only when western patrons give democratic development equal weight to petroleum development will Kazakhstan's neglected citizens begin to know and care.

Russell Sunshine
Umbria, Italy

Thatcher's long shadow

SIR – *The Economist* perpetually delights in lauding the Thatcher years. So besotted are you that you mention her name—or derivatives thereof—nine times in your article on Blairism ("Tony's big ambitions", June 9th). What you fail to mention is that while Margaret Thatcher was one of the most effective politicians since the second world war she is perhaps the most detested. Her style, like her reforms, is remembered by many as hard and brutal, cruel even, creating an image of the Tories as a heartless and insensitive party in the minds of many voters. If the Thatcherite revolution is seen as necessary but painful then many Britons still bear the scars and feel the associated pain.

The memory of Mrs Thatcher's swinging hatchet has damaged not only the British psyche but also the Tory party itself. To attain power again the Tories must distance themselves from the trauma of Thatcherism and dream up their own brand of "compassionate conservatism". British voters, once viciously mauled, are proving very wary indeed.

Michael Browne
Heidelberg, Germany

No joke king

SIR – You say that "France's monarchists are, deservedly, a joke" (Charlemagne, June 9th). I am one of your "mad monarchists" who, with thousands of others, is ashamed of our French republic, the *gueuse*, scandals, embezzlement, corruption, inefficiency, and, of course, the past Trotskyite treason of our prime minister. What is the joke?

Michel Durand
St Germain-en-Laye, France

Language hoops

SIR – For the benefit of American readers could you provide an explanation of the more quaint English phrases that appear in your articles? Case in point: "cock-a-hoop" (Lexington, June 2nd). To my ears, this sounds like something one might buy in a San Francisco "speciality" shop.

Karen Hines
Half Moon Bay, California

Letter from the Editor

MADAMS, SIRS — In the first issue to use our new design, I invited readers to send me their reactions ("Our new design", May 12th). Well, *The Economist*'s readers are no shrinking violets. More than 750 have already written in, and the letters and e-mails are still arriving. And I am delighted to report that the response has been overwhelmingly positive.

Human nature being what it is, anger tends to prompt more people to write letters to editors than pleasure. Yet a full two-thirds of correspondents said they were either definitely (436) or mainly (75) in favour of our new clothes. Of the third who were critical, only 82 people were clearly and strongly opposed. Many of the other 184 "critical" letters were put in that pile simply because nothing positive was said in them, and no clue was offered to the writers' overall feelings.

There were many specific criticisms, both in the positive and the negative letters. We shall reflect upon them all as we review our progress with the new design after its first few months. The largest number concerned the new arrangements for The world this week and Contents, so I shall be thinking particularly hard about those pages.

One fear loomed especially large in the negative letters. It was that *The Economist* now looked less different from other magazines, notably our American rivals Time, Newsweek and BusinessWeek, so presumably we were going to become more like them in other ways, too, running cover stories on celebrities, or self-help, or the 25 top this or that. Fear not: we won't be. *Vive la différence*.

Bill Emmott
25 St James's Street
be@economist.com

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The right to good ideas

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From The Economist print edition

Intellectual-property rights are not just for the rich world. Carefully constructed, they can help the poorest too

"PATENTS kill!" was the simple message of AIDS activists in South Africa earlier this year. Battle had broken out between the government and multinational drug companies over the relaxing of patent restrictions which, it was hoped, would improve the flow of costly medicines to the country's 5m sufferers from HIV. Meanwhile, in north-west Mexico, poor farmers are furious about a patent issued to an American company giving it the exclusive right to market yellow enola beans in the United States. The Mexicans say the bean, which they have grown for generations, is not a novel invention, and that the patent unfairly restricts their ability to export the crop north of the border.

So patents are obviously bad for poor countries—or so many activists argue. They are largely the preserve of western multinational companies, allowing them to establish monopolies, drive out local competition, divert research and development away from the needs of poor countries and force up the price of everything from seeds to software. In the process, patents prevent poor people from getting life-saving drugs, interfere with age-old farming practices and allow foreign "pirates" to raid local resources, such as medicinal plants, without getting permission or paying compensation.

Yet the picture has another side. In Mexico, local musicians are finding it increasingly hard to sign contracts with international record companies, since almost two-thirds of the cassettes and CDs sold in the country are pirated. In India, biotech entrepreneurs are busy trying to hawk their products abroad but are wary of commercialising them at home. Since Indian patent law does not fully cover pharmaceuticals, the fruits of their costly research are hard to protect from copycats.

By this token, intellectual-property protection is good for poor countries. It encourages domestic industry, boosts foreign investment and improves access to new technologies. To true believers, intellectual-property protection is part of the gospel of modern economic growth, along with free trade and democracy.

These two conflicting views have turned intellectual-property rights—such as patents, copyright, trademarks and trade secrets—into one of the most contentious areas in international development. The debate has been sharpened by two new forces. The first is increased interest in the "knowledge economy", in which a company's chief assets are not so much physical capital as bright ideas and the intellectual-property rights which control their exploitation and give the firm a competitive advantage. Some of these patentable innovations, such as "one-click" business methods, challenge conventional ideas of invention. Other advances, such as genetically modified organisms, not only tilt at that standard, but also raise tricky questions about the ethics of laying claim to living things. Between them, however, such developments have led to a surge in patent applications.

The second force is globalisation. Intellectual-property rights used to be largely a domestic issue, with countries deciding on their own levels of legal protection and enforcement. The World Trade Organisation

(WTO) has changed all that. As part of the trade deal hammered out seven years ago, countries joining the WTO also signed on to Trips (trade-related aspects of intellectual-property rights), an international agreement that sets out minimum standards for the legal protection of intellectual property.

Many poor countries think that Trips gives them a raw deal. According to Rashid Kaukab, of the South Centre in Geneva, they feel it commits them to the heavy expense of bringing their legal protections and enforcement up to western levels without much sign of the benefits claimed for it. Like almost every other measure associated with the WTO, Trips has become a battleground between those who favour, and those who oppose, the spread of global capitalism.

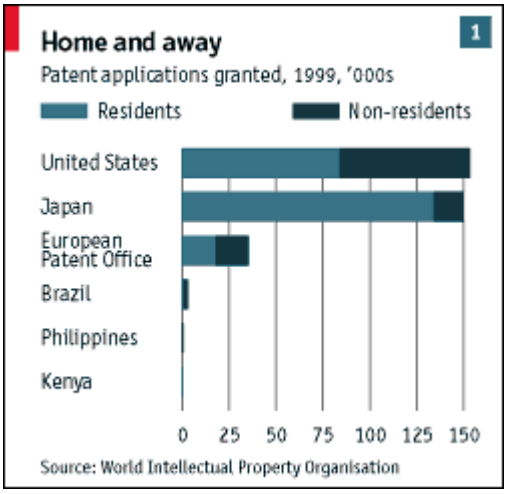
What Trips demands

On June 18th, the 141 member-governments that make up the Trips council sat down in Geneva for their regular review of how members are getting on with the tricky business of implementing its provisions. Contrary to popular misconception, Trips does not create a single, universal patent system. Much to their annoyance, multinational companies seeking protection round the world still depend on each country's patent office to grant those rights and their judicial, customs and police services to enforce them, although some European countries, for example, have got together to offer region-wide patents.

What Trips does, however, is lay down a long list of ground-rules describing the protection these systems must provide. These include extending intellectual-property rights to include computer programs, integrated circuits, plant varieties and pharmaceuticals, which were unprotected in most developing countries until the agreement came along. Patents can be granted for any technological process or product, so long as it is new, inventive and has an industrial application; such protection lasts 20 years from the date of application. Patent rights are valid no matter whether the products are imported or locally produced, and protection and enforcement must be extended equally to all patent-holders, foreign or domestic.

Patents can be granted for any technological process or product, so long as it is new, inventive and has an industrial application

Countries vary greatly in how closely their existing law matches the Tripsmark, largely according to their degree of economic development. America, for example, has a Patent and Trademark Office with an annual budget of $1 billion and a staff of more than 3,000 highly-trained scientists, engineers and legal experts to examine claims. It also has more than 600 judges to preside over patent disputes, an extensive antitrust authority on the lookout for monopolies and a vast customs service to clamp down on counterfeiting. At best, least-developed countries have half a dozen patent examiners and not much else.



Such disparities are nothing new. As Graham Dutfield, at the Oxford Centre for the Environment, Ethics and Society, points out, countries tend to clamour for strong patents once they have an industry to protect. For most of the 19th century, Switzerland had no patent system at all. Once its industrial base was mature enough to foster home-grown innovation, patent enforcement became a matter of urgent self-interest.

With Trips, however, developing countries no longer have the luxury of moving at their own speed. According to the terms of the agreement, most of the poor world had until the beginning of 2000 to bring their legal protections up to scratch. The least-developed countries were given a stay of execution until the end of 2005.

Upgrading does not come cheap. Keith Maskus, an economist at the University of Colorado, reckons that it will cost a poor country roughly $1.5m-2m just to build a bare-bones infrastructure to implement Trips. The World Intellectual Property Organisation gives technical assistance to countries trying to draft intellectual-property legislation or set up their patent offices, but poor places like Mauritius say more

money and skilled manpower is needed. Not surprisingly, countries fighting infectious disease or civil war would rather deal with these than with patents.

So far, few countries have managed fully to comply with the agreement. As with other trade-related squabbles, countries that consider themselves damaged by another's failure to live up to Trips can take their grievance to a dispute-settlement panel at the WTO. There are other means of persuasion, too. The office of the United States Trade Representative has a special procedure for investigating countries whose legal protections do not come up to scratch, and reserves the right to take action against them. America has also been busy signing trade agreements with countries such as Jordan, which include a requirement for higher standards than Trips demands.

So far, few countries have managed fully to comply with the Trips agreement

The rich world's language

In theory, such mechanisms should serve both rich and poor alike. But Trips is essentially a set of rich-world conventions that include a few concessions to poor countries. It was pushed on to the trade agenda by America, Europe and Japan, which together hold the lion's share of the world's patents and whose companies wanted more protection abroad. The American pharmaceutical industry, for example, estimates it loses $500m in India alone each year because of poor patent protection. The rich world certainly does well out of stronger protection abroad: America, for example, earned $36 billion in royalties in 1998 from patent licences and the like.

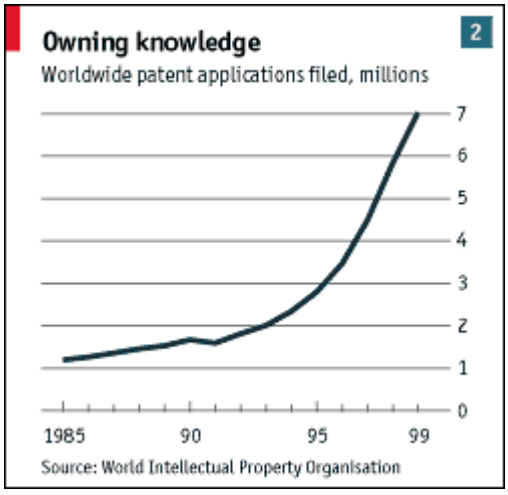
As Jayashree Watal, a former trade negotiator for India and now an intellectual- property expert at the WTO, recalls, developing countries went along with Tripsin the hope of winning trade concessions in such areas as farming and textiles. Such indirect gains have yet to materialise. Some developing countries would like to see Trips taken out of the WTO altogether. But most see a virtue in keeping it in the hothouse of world trade, and using it as a bargaining chip with industrialised countries.

In the meantime, the world's poorest countries are still waiting for the promised benefits of stronger patent protection at home. But that flood of foreign direct investment, technology transfer and home-grown innovation also depends on other things, including market size and competition policy. More advanced developing countries, such as India, may see such rewards eventually. In the short term, however, a stronger patent regime will mean higher prices for goods and more unemployment once copycats are driven from the market.

Room to wriggle

Much of the poor world's anxiety about Trips is focused on two issues: access to medicines and protection of traditional resources. Both were on the agenda at this week's meeting in Geneva, where members aired their differences. Many developing countries, among them India and a clutch of sub-Saharan states, would like clarification of the agreement's provisions and exceptions to protect public health and the environment, and amendment of its articles on the patenting of life-forms. America and Japan are opposed to any change in the letter of the agreement; the EU may be more accommodating.

Patents have attracted much of the blame for the gap between rich and poor countries in their supply of high-tech medicines. Earlier this year, Oxfam, an international aid charity, launched a campaign to improve poor countries' access to such drugs with a call for a wide reform of Trips. Yet some developing countries, such as Brazil, concede that the agreement is flexible enough in theory, giving them sufficient room to craft their domestic patent legislation in a way that also protects public health. What they want to ensure is that the developed world interprets these provisions in the same generous light.



Many of the most effective drugs to treat such scourges as HIV and malaria are covered by patents in the industrialised world. These allow the developers to recoup their steep research spending, but also drive the cost of the drugs far higher than poor countries can afford. In much of the least-developed world,

however, these patents do not apply. In theory, these countries could import generic copies from other poor countries that are not yet obliged to comply with Trips but have the capacity to churn them out, such as India. In practice they do not, largely because they lack both the money to buy the drugs even at bargain-basement prices, and health-care systems to deliver them.

There is, however, a group of developing countries, such as South Africa, that are expected to toe the line and enforce such drug patents, but find it hard to pay the sort of prices pharmaceutical companies have, until recently, been asking. The Trips agreement offers two main options to ease their way. The first, called “compulsory licensing”, allows countries either to manufacture or import copies of a drug without the patent-holder’s approval, in some circumstances—a national emergency, for example—provided that they fulfil certain conditions, such as paying the patent-holder compensation. The second possible fix is parallel importing, which allows countries to seek cheaper sources of a patented drug from abroad. Drug companies hate this practice, but Trips has nothing to say against it.

Rich as well as poor countries are worried about the effect of patents on drug prices. They are equally concerned about the patenting of plants, animals and genes. Part of this is a moral objection to the exclusive exploitation of living things. But poor countries also have practical objections. The developing world, home to a rich array of the world’s plants, animals and micro-organisms, is a potential treasure trove of starting material for new drugs and crops, which could do the poor much good. But few people in, say, Andean or Indonesian villages have the $20,000 needed to obtain a patent in America, or the $1.5m it costs to challenge one.

Few people in Andean or Indonesian villages have the $20,000 needed to obtain a patent in America

Money is little object, however, to many western entrepreneurs who venture to far-flung parts, bring home such riches and then proceed to patent them. Some of these patents will be warranted, since the “bioprospectors” will have enhanced nature with some inventive step. But ActionAid, a British charity, and other NGOs have documented dozens of instances where nature is left pretty much unadorned and a patent is issued anyway, without any acknowledgment or reward for the villagers who may have tipped off the “inventor” in the first place.

A growing alliance of developing countries would like to see this “biopiracy” stopped. Costa Rica, for example, has laws exempting genes from patenting. Others are introducing laws that would require all those applying for intellectual-property rights over, say, a plant variety, to declare where they got it and to prove that they not only have the consent of its native users, but have arranged to share the eventual rewards of commercialisation. Brazil, among other countries, would like to see such provisions explicitly written into Trips. The United States, however, is strongly opposed to any change.

For richer, for poorer

As the fuss over biopiracy shows, poor countries are not opposed to a proper patent regime; they simply want one that fits their needs. A few interesting experiments are in progress. One of them is the Honey Bee network, run by the Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI), which sends out volunteers into rural India to find village “oddballs”, the people who are known for working in a different way from others. The volunteers then document their bright ideas or early inventions, such as a motorcycle-powered plough or a tilting manure cart, in a database which comes in seven local languages, and includes plenty of pictures to help illiterate farmers understand the gist of the invention. The network now has 10,000 innovations on its database, with eight patents pending, and has also benefited from a micro-venture-capital fund to help get the inventions off the ground.

A similar project is under way in Venezuela, where Otro Futuro, a local charity, and the Policy Sciences Centre of New Haven, Connecticut, are working jointly to help the Indians of the Dhekuana tribe assemble their traditional myths, music, knowledge of medicinal plants and other traditional folklore into an atlas. A written record is not only a valuable precaution against a sudden loss of this largely oral heritage, but also serves as a safeguard against piracy abroad. The United States Patent Office, for example, will not grant a patent on an invention if there is “prior art”, or earlier evidence of its existence in the public domain. But, unlike its European counterpart, the American office does not recognise foreign oral evidence as prior art.

Making the Dhekuana database public might help to stem biopiracy. But as Frank Penna of the Policy Sciences Centre points out, it may not bring the tribes much material reward, since they themselves

cannot patent the contents of the database once it has been disclosed. The Dhekuana now have their own team of patent lawyers, paid for by the World Bank, who are trying to find a way to register their traditional knowledge, possibly as a trade secret, in order to secure the tribe's interests.

But according to Michael Blakeney, of Queen Mary and Westfield College in London, there are limits to shoehorning such traditional practices into the holes provided by conventional intellectual-property law. Western patent systems grew out of a particular model of innovation at a particular time in history. They assign specific rights to individuals or corporate entities for well-defined developments for prescribed periods of time. This model does not fit neatly with the sort of collective ownership the Dhekuana have, where the "invention" is vague and its origins are lost in the mists of time.

New models will probably be needed to protect such traditional knowledge, and these will not be easy to create. To some, such initiatives smack of political correctness; others see them as fair reward. Their introduction would help to turn the rising tide against Trips by showing even the poorest developing countries that intellectual-property rights can be an opportunity, not just a threat.

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The economy

Will Bush fight for free trade?

Jun 21st 2001 | WASHINGTON, DC
From The Economist print edition

The looming fight for trade promotion authority—formerly called fast-track—will show how committed the president really is to free trade

Get article background

GEORGE BUSH has been turning up the pro-trade rhetoric. His speeches in Europe were peppered with references to the potential of trade. Twice this week—to farmers and business leaders—he has touted the benefits of free trade. His aides talk about a process of competitive liberalisation, where America pushes ahead simultaneously with bilateral, regional and global trade talks. But whether all these fine-sounding plans amount to much depends on one big unknown. Will Mr Bush persuade Congress to grant him "trade promotion authority" (TPA)?

Mr Bush has said he would like Congress to pass TPA by the end of this year. This power, which used to be known as "fast-track", allows the president to negotiate trade agreements, leaving lawmakers the option only of voting for or against the final result. This sounds like a technicality. But, without it, foreign governments have been reluctant to negotiate with America, since any agreement they reach could be dramatically amended by congressmen.

Fast-track negotiating authority lapsed in 1994, and President Clinton famously failed to revive it in 1997. If Mr Bush, too, fails, the consequences could be dire. Brink Lindsey, a trade expert at the Cato Institute think-tank, even suggests it would call into question America's entire post-war commitment to global liberalisation.

If the stakes are high, so too are the difficulties. During the 1990s, despite a booming economy, American lawmakers became increasingly leery of international trade; they are also now much less willing to give the president open-ended negotiating power. Democrats, in particular, have become determined to link labour and environmental provisions to trade agreements, an anathema to many Republicans (as well as to developing countries), who see this as a pretext for protectionism.

Disagreements on these "blue" and "green" issues poisoned the trade atmosphere during the Clinton administration. Many lawmakers are also determined to tie the president's hands in other areas by demanding that controversial issues, such as anti-dumping rules, be excluded from any negotiations. At issue therefore is not just whether Mr Bush can get TPA, but also whether the negotiating authority he gets is worth having.

So far the administration has tried to combine firm tones with conciliatory gestures. On June 18th Mr Bush minced no words in describing the kind of TPA he sought or in laying out what he thought about blue and green issues: "I mean a TPA bill...that's not laden down with all kinds of excuses not to trade. I want a bill that...doesn't frighten people from trading with us...If you are a poor nation, it's going to be hard to treat your people well. And if you're a poor nation, it's going to be hard to have good environmental policy."

Robert Zoellick, Mr Bush's top man on trade, has tended to sound more conciliatory. He points out that the "trade principles" laid out by the administration envisage a "tool box" of measures to boost labour and environmental standards, which range from using the World Bank (to encourage borrowers to improve work practices) to strengthening the profile of the International Labour Organisation.

At the same time, the Bush team are trying to show that they will help industries in trouble. Witness the

recent decision to launch investigations into steel imports which could result in the imposition of quotas. Mr Zoellick touts this as a concrete example of dealing with real problems, rather than “spending hours negotiating” clauses in trade agreements. The political calculation is more bald: placating the powerful steel lobby is a political imperative if TPA is to have a hope of passage. Hence the paradoxical situation where Mr Bush is acting as a protectionist apparently in pursuit of freer trade.

Unfortunately, it will be an uphill battle. Head-counters in the House of Representatives reckon there are around 30 Republican congressmen implacably opposed to TPA, either because they are basically isolationists or because of powerful influences from the unions. Given the Republicans’ narrow majority, that means Mr Bush must bring pro-trade Democrats on board. Just as with the tax cut, Mr Bush needs to appeal to centrist “New Democrat” lawmakers, though his admirably feisty comments on blue and green trade issues have not helped that cause.

House Republicans have just made that harder still. On June 13th Phil Crane, a Republican free-trader, introduced a TPA bill that offered no fig leaves on labour and the environment. Pro-trade Democrats are furious at what they deem a partisan effort to ignore their concerns. Sander Levin, a congressman from Michigan who helped pass last year’s China bill, says TPA is “headed for a dead end at the moment”.

The Senate, traditionally much more friendly to free trade, is also causing problems. The Democrats now set the agenda, and Max Baucus, a senator from Montana who helped Mr Bush get his tax cut but whose commitment to free trade is conditional, is now chairman of the key committee for passing TPA. He talked this week of his “increasing pessimism” that TPA will pass this year.

A question of commitment

Overcoming these hurdles will not be easy, particularly since there is no real deadline to put pressure on lawmakers. The November meeting of the World Trade Organisation in Qatar is the last real chance to launch a new trade round. But America has started global trade talks without fast-track before. It just cannot complete them. As Gary Hufbauer of the Institute for International Economics points out, without a credible “forcing event” the prospects for TPA look dim.

Moreover, American business is not yet as vocal as it needs to be. Though business lobbyists are limbering up—this week saw the launch of USTrade, a coalition of business groups to promote TPA—it is harder to gin up grass-roots pressure for an amorphous bill that grants the president a technical authority than it is for a specific trade bill, such as last year’s agreement with China. The risk, however, is that if TPA is not passed this year, the moment will be gone. Few lawmakers think it has much chance of passage in an election year.

That is why Mr Bush’s personal role is so crucial. TPA will not pass Congress on its own merits; it needs considerable presidential pressure and political capital behind it. Mr Bush has long labelled TPA one of his priorities; the question is how much of a priority. His record on the tax cut shows that he can focus effectively on issues he really cares about. If his rosy rhetoric is to become reality, he must now do the same on trade.

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Dealing with Russia

Pawn to king four

Jun 21st 2001 | BRDO PRI KRANJU, SLOVENIA
From The Economist print edition

Look between the words, and progress is being made with Russia

IMMEDIATELY after George Bush's trip to Europe, both the Russian president and America's national security adviser reiterated their countries' differences on the most contentious issue raised during the tour, Mr Bush's proposed deployment of a missile-defence system. Vladimir Putin warned America against proceeding on its own. Condoleezza Rice said her country would be prepared to do this if need be.

AP

Comrades-in-arms

This spat cast something of a pall over the plaudits Mr Bush had earlier won from European leaders for his willingness to engage in the big issues of post-cold-war security, and even over the praise he got from Mr Putin himself for calling Russia a friend. Was there nothing more to the tour than warm words? A closer reading of the two sides' declarations is more optimistic.

At their summit in the Slovenian Alps, Mr Putin suggested he would be willing to negotiate about missile-defence systems. He has long been concerned about nuclear threats on Russia's southern border. But in Slovenia he slithered away from Russia's previous "categoric" opposition to doing away with or amending the Anti-Ballistic Missile (ABM) treaty which outlaws defensive systems. "We start with the idea that the 1972 ABM treaty is the cornerstone of the modern architecture of international security," he said, implying that Russia might end up somewhere else by negotiating a new security arrangement of which missile defences might be part. And after the meeting he made this possibility explicit, saying Russia wanted to work with America to flesh out what that "architecture" might be.

If Mr Putin seems to have taken the basic decision to negotiate with America on missile defence, Mr Bush may have made an even more important concession. In the past, he has talked about deploying a missile shield in consultation with NATO allies. But he has shown no sign of wanting the system to be restricted by treaty. The administration has an almost pathological aversion to treaties that limit America's freedom of action—witness its attitude to the Kyoto accord, among others.

But the summit suggested that the administration is prepared to negotiate over missile defences before a design has been determined and a timetable for deployment drawn up. That would imply America might accept some sort of agreed limits to the shield, which would be a huge step towards deployment because it gives Russia an incentive to go along with the idea.

Russia does not object to a limited missile shield aimed at proliferators like North Korea or Iran. It is just as threatened by them as America is. Rather, its opposition is based on fear that a defensive shield might one day be capable of protecting America against Russia's own nuclear deterrent. If that happened, the shield would neutralise Russia's nuclear forces—and its remaining pretensions to be a great power.

Russia has only two options to head off that threat. The first—oppose missile defence root and branch—became harder to pursue when, at the start of Mr Bush's trip, a number of NATO countries said they supported his determination to explore technologies for a defensive shield. The second is to embed the shield in an agreement that limits its capabilities.

It is easier said than done. Quite apart from the difficulty of defining what "limited" means, both countries have strong domestic constituencies opposed to compromise. After Presidents Putin and Clinton agreed that nuclear proliferation threatened both countries, the Russian army newspaper, *Krasnaya Zvezda*, said this was American propaganda. In the United States, conservative unilateralists will balk at

the slightest hint of letting Russia restrict America's defence policy.

Against that, the top priority for Russia's generals is to modernise their weapons. They do not have much money for this. It would help if they could avoid a missile-defence race with America. It would be better still if (a big if) they took part in an international effort to develop a missile shield financed largely by America.

A more hostile alternative would be for Russia to reverse its policy of decommissioning offensive nuclear weapons. A study by two American think-tanks suggests that, in the absence of a deal on a nuclear shield, Russia might retain 3,500 warheads by 2010, though others contend that it does not have the money for more than 1,000 or so. Cleverly, Mr Putin raised this threat in Slovenia, and in Moscow this week suggested that a unilateral American withdrawal from the ABM treaty would provoke Moscow to put more warheads on its remaining missiles. A chess game that might take a decade has begun.

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The first referendum on Mr Bush

Passed

Jun 21st 2001 | CHESAPEAKE
From The Economist print edition

But what else does it mean?

RANDY FORBES doesn't live up to his first name. He's dour and lugubrious; seemingly incapable of smiling, let alone flirting. But the Republican's victory over his decidedly more jolly Democratic opponent, Louise Lucas, another state senator, in the battle for an open congressional seat in Virginia will surely have brought a much-needed smirk to the face of George Bush.

Virginia's Fourth District, a patchwork of peanut and pig farms, sprawling military bases and shiny new suburbs, is one of the nation's rare swing districts. Mr Bush carried it by a mere 500 votes last year. Both the Democrats and Republicans were hoping to win the special election, which was triggered by the death in March of the long-time incumbent Democrat, Norman Sisisky. Together, the candidates spent $4m in less than three months.

The Republicans, still smarting from the defection of Jim Jeffords in the Senate, were particularly desperate to win "the first referendum on the Bush presidency". Even with Mr Forbes's victory, they maintain a majority of only a dozen seats in the House. Now they are scouring the result for themes and tactics for next year's congressional contest.

It does not offer many. Both candidates talked tough on defence (the source of thousands of jobs in the district). Both paid scant attention to foreign policy. There was a debate about privatising Social Security; Mrs Lucas opposed it, Mr Forbes favoured it, but it seemed to generate more heat than light.

Race was more important. Around 40% of the district's inhabitants, including Mrs Lucas, are black. But outside her gritty home town of Portsmouth, where she once worked as a shipfitter, the black turn-out was relatively low. That dashed Democratic predictions of a belated protest about the November debacle in Florida, where blacks claim they were disenfranchised.

Mr Forbes, a former state party chairman who was running for lieutenant-governor when Mr Sisisky died, easily offset the black vote with a massive white turnout in the suburbs to win by 52% to 48%. In Chesapeake, where he lives, many voters are "come-heres" from other states more smitten with the Republican mantra of smaller government. Various Republican big-shots, including the vice-president, Dick Cheney, turned up to reiterate that theme.

But the heart of both campaigns was less lofty. The Republicans ran television spots attacking Mrs Lucas for opposing anti-crime laws in the Virginia Senate. Democrats were little better, circulating a brochure that pictured a black child on the cover and declared "12m of us will be left behind" by President Bush's budget. Next year's battle will be nasty.

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Lexington

Hillary, you won the war

Jun 21st 2001
From The Economist print edition

But will health care get any better?

HERE we go again. In 1994, the Democrats lost control of the Senate thanks to Hillary Clinton's disastrous attempt to reform American health care. Now they are back in control of the Senate by a whisker—and they've put health care right at the top of their agenda. Are they mad? Or have they discovered a formula for turning a sow's ear into a silk purse?

Mad is hardly the first word that comes to mind when you look at Tom Daschle, the Senate's cunning new majority leader. It was easy enough to demonise Hillarycare as a dangerous scheme to turn America into a gigantic version of Sweden. Mrs Clinton can't help but give the impression that she thinks that they do this sort of thing better in Stockholm. But a "patients' bill of rights", which lays down standards of service and, in the last resort, allows patients to sue managed-care organisations, is a different matter. The bill has three big things going for it.

The first is the belief in citizens' rights. It is hard to do anything in America these days without being reminded of the fact that the constitution enshrines a bill of rights. The victims of sexual assaults on campus have their own bill of rights. Taxi cabs display a passengers' bill of rights. Even the wily degenerates on the "Jerry Springer Show" forever invoke their rights.

The second is love of litigation. Americans think nothing of calling their lawyers if their daughters fail to get into the cheerleading squad or their astrologers give them the wrong advice. So why shouldn't they call them to fix the health-care system?

The third is hatred of HMOs. In the early 1990s only a handful of Americans were subjected to managed care. Now four out of every five workers have been herded into health plans, and managed care has taken over from communism as the bogeyman that unites the country in fear and loathing. These are the organisations that brought America such charming medical innovations as drive-through childbirth (giving women no more than a day in hospital to give birth). And these are the organisations that torture thousands of Americans every day with incomprehensible forms, unanswered phones and unpaid claims.

Only 15% of Americans say they have a great deal of confidence in HMOs—less than have confidence in electricity companies (28%) or public schools (38%). George Bush may be able to buddy up to the former KGB chief who now rules Russia without risking more than a few raised editorial eyebrows. But if he did the same to the head of Aetna, the alleged provider of health-care services to *The Economist* amongst others, he would be looking at a one-term presidency.

It is hardly surprising, then, that there is such an air of inevitability surrounding the proposed legislation. The House has already passed its version of the bill. The Senate version is being sponsored by John McCain as well as two Democrats, Ted Kennedy and John Edwards. The Democrats have already taken Mr Bush's education bill and turned it into a Democratic one; now they are about to force Mr Bush to accept a thoroughly Democratic health-care reform.

This is not to say that the bill will pass without a fight. HMOs and small businesses have succeeded in blocking similar legislation for the past five years. They are currently pouring millions of dollars into lobbying and advertising in an attempt to do the same again. Mr Bush vows that he will veto any legislation that makes it too easy to sue HMOs.

But their cause already has the smell of defeat. The bill's supporters can point to the enthusiastic endorsement of the medical profession. (Doctors are furious that they can be sued for medical malpractice but HMO bureaucrats, who are increasingly making medical decisions, cannot.) And a growing number of states have strengthened patients' rights over the past few years. Even Texas has a patients' bill of rights. Mr Bush may be able to delay the legislation. He may be able to push it a little closer to a much softer bill (co-sponsored, ironically, by James Jeffords, the Vermont turncoat) that has also been introduced into the Senate. But it is unlikely that Mr Bush will be willing to waste more than one veto on the subject.

Hill of beans

So the politics are sorted, but there is still the casual afterthought: will the impending law do any good? The problem with rights is that they don't come cheap. The bill will impose more regulation on a health-care system that is already drowning in regulations. It will push up the cost of health care, as America's voracious trial lawyers extract their pound of flesh. And it will do nothing for the real victims of American healthcare: the 44m people who have no insurance. Whatever the other faults of Mrs Clinton's plan seven years ago, it was motivated by an entirely laudable desire to make health care universal. Now the number of uninsured will rise as businesses respond to those rising costs by cutting back on their coverage.

Republican lore holds that the defeat of Hillarycare was one of the great triumphs of the 1990s. They may have to think again. The Democrats are enjoying the double benefits of bashing HMOs while calling for cheap drugs for the old and free health care for the poor. Health care is also a good example of incremental legislative sprawl at its most Clintonic.

"If what I tried before won't work," Bill Clinton confessed a few years ago, "maybe we can do it another way...a step at a time, until we eventually finish this." The next little step will be subsidised drugs for old folk. After that will come free health-care coverage for uninsured children and a reduction in the age of eligibility for Medicare. Some of these things are no more than people in a civilised country deserve, but they all push up costs. And every new bit of legislation brings America a step nearer to Hillarycare. The junior senator from New York may have lost the battle in 1994. But she and her fellow Democrats are getting ever closer to winning the war.

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New York politics

Hooray for Herman

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A challenger for Michael Bloomberg

"BUSINESSMEN are so much more forthright than politicians. They say what they mean...they are more open, more direct", reckons Michael Bloomberg, a billionaire who is running to become New York's new mayor. How ironic, then, that his first opponent—for the Republican ticket—is a veteran politician who plans to out-forthright Mr Bloomberg.

Herman Badillo, who came to the city from Puerto Rico as an 11-year-old orphan, has run unsuccessfully for mayor three times, first in 1969. He was deputy mayor under Ed Koch, and the first Puerto Rican elected to Congress. At 71, his age (though he is sprightly) may be an even bigger drawback than his lack of money and his lack of Republican kudos. Like Mr Bloomberg, who switched from the Democrats just in time to run, Mr Badillo has not been a Republican for long, joining in 1998 after accusing his former party of being unable to "make things better because they don't understand what is wrong."

What Mr Badillo does have going for him is a fairly clear idea of what needs to be done to continue the revival of New York that began under Rudolph Giuliani, who will step down in January under term limits. Indeed, Mr Badillo has been an invaluable ally of the mayor during the past eight years, and is clearly miffed that his friend is cuddling up to Mr Bloomberg.

So far Mr Bloomberg has been relatively vague on details: the media baron was the only mayoral candidate to avoid a question-and-answer session at the Manhattan Institute. Mr Badillo, by contrast, has an abundance of them.

On law and order, he would stick to Mr Giuliani's tough line, but also send every officer on a sensitivity training course and establish a High School for Criminal Justice to attract minority students to the police force. On education, he would completely end "social promotion": the practice whereby students pass to a higher year even if they have failed to reach adequate levels of educational attainment, providing they also attend some summer school. He accuses Harold Levy, the schools chancellor, of being "afraid of antagonising parents", and dismisses the summer school as "a fraud".

Having forced the City University of New York, where he was chairman, to end open admissions and carry out meaningful tests, Mr Badillo has some credibility on this point. He was also once called a "racist" and a "traitor" by Latino leaders after he said, accurately, that some immigrant students arriving in New York from Mexico and the Dominican Republic had "never been to any schools". And he has even dared talk about phasing out rent control—albeit in conjunction with schemes for more affordable housing.

"How does [Mr Bloomberg] think he can beat me? He has lots of money, but no agenda and no experience," says Mr Badillo, whose slogan is "Experience money can't buy". His relative lack of money may not matter much during the primary, where voters are few, dedicated and already familiar with his record. After he has dispensed with Mr Bloomberg, he says he will pick up plenty of money and Mr Giuliani's support. He will then proceed to beat one of the four Democratic candidates—in a city where Democrats outnumber Republicans five to one.

Most pundits put this in the realm of make-believe. Even Republican Party leaders tried to dissuade Mr Badillo from standing, to give Mr Bloomberg a clear run. In Mr Badillo's favour stand two facts: that New York sometimes favours long shots (George Pataki, the current governor, was once thought of as one); and that successful businesspeople whose only answer to tricky political problems is that they are successful businesspeople have a habit of failing in American politics.

Indeed, even if he loses the primary, Mr Badillo may be doing Mr Bloomberg a favour. In order to win the Republican nomination, the mogul will surely have to come up with at least a few concrete answers to New York's thornier problems. Going a few rounds with an old pro will train him up for the fight against

the Democrats.

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The next global city?

The blob that ate east Texas

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For most outsiders, Texas is a foreign country. Its biggest city, though, might surprise the rest of the world

WHEN a Texan in a big hat tells you how wonderful his home town is, reach for the salt. Bob Lanier, the former mayor of Houston, isn't actually wearing a Stetson as he gazes from his penthouse down on a city that sprawls 25 miles away in every direction. But metaphorically he is. "Houston," he claims, "could become one of the great cities of the world." The remarkable thing is that he might be right.

From the time the city was founded in 1836 until the 1970s, Houston doubled in size almost every decade. Then, despite one of the deepest slumps any city had experienced since the 1930s, the metropolitan area managed to add 1m people in the 1990s to grow to 4.7m, making Houston the fourth-largest city in America.

It is already bigger than Berlin and, with a GDP of around $215 billion a year, has a larger economy than Hong Kong. Because it is the nearest metropolis to the cities of northern Mexico, it may attract another 2m people over the next two decades, which would give it almost the same size of population as London has now.

But a global city? These are few and far between. Houston can hardly dream of becoming a global financial centre like London, New York or Tokyo. But its business leaders think it could become a cosmopolitan, entrepreneurial hub—a Hong Kong, a San Francisco or even a new Los Angeles. It shares LA's smog, its sprawl, its Latino culture, even its ugly hubris; and by some measures it surpasses LA's ability to reinvent its economy. Can it use its adaptability to turn itself into a properly international place?

Oil be there for you

Its hopes still depend disproportionately on its most global industry. Energy accounts for half of Houston's economy. During the 1970s, while the rest of America stagflated, Houston boomed as high oil prices sucked billions into the country's oil capital. In that decade alone, the city built almost as much new office space as the total amount of commercial property available in San Francisco. Money was being lent and business plans formed on the assumption that oil would go to $50 a barrel. At the height of the boom, about 80% of the city's economy was oil-related.

The bust was traumatic. By the mid-1980s, all that new office space stood empty. Every big local bank was taken over. Only one of the property developers then in business is left. Unsurprisingly, a certain paranoia lingers in the city about the oil business. The Greater Houston Partnership, the main business lobby, has spent the past 20 years frantically encouraging the city to diversify. Yet the fact is that the energy business and Houston itself have emerged stronger from the terrible bust.

As company after company was forced to cut back, they collapsed their operations back into Houston and seem unlikely to be dispersed again. In 1999, when oil slumped to $10 a barrel and the number of oil rigs in America fell to its lowest point in living memory, Houston still managed to add energy jobs.

Now another boom is in prospect, with oil prices high again. Matt Simmonds, the head of a local energy consultancy, argues that America's past reluctance to build new power plants will force it to increase energy capacity by around 30% in the next ten or 15 years. The rig count is already 50% above last

year, and natural gas exploration is soaring. If oil prices stay high (a big if) and if other countries share America's energy worries, Houston will grow in importance.

It is hampered by a wild-catting reputation. In fact, the energy business is changing in three significant ways, and Houston is the centre of all of them.

First, technology. Not long ago, oil drills went down to 1,500 feet (457 metres). Now they go to 15,000 feet. Companies use four-dimensional computer imaging to plan new fields (time is the fourth). This is making oil an information-intensive business and puts a premium on the kinds of skills available in Houston.

Second, the cost of new oilfield exploration and development has risen so far that even newly merged behemoths cannot always finance them alone. This makes deal-making vital, which is good for the city where deals are made. If you are not attending, say, lunch at Houston's Petroleum Club, you are out of the loop.

Third and most important, oil is now only part of a bigger energy business, which includes electricity. Once divided into self-contained regional markets run by local utilities, the electricity business is being changed by the gradual emergence of a national grid dominated by power producers and traders. Big users now decide whether to buy power at long- or short-term rates, rather as they arrange their financing. A new business of energy arbitraging is emerging, and its centre is Houston.

Three of the five new skyscrapers going up downtown have as their main tenants energy companies that did not exist ten years ago. One of them, Enron, is building a 50,000-square-foot trading floor—a single-company answer to the Chicago Board of Trade. Enron has probably been Houston's most successful energy company of the past ten years. It has never explored for, pumped up, or refined a single drop of oil.

Out of the black stuff

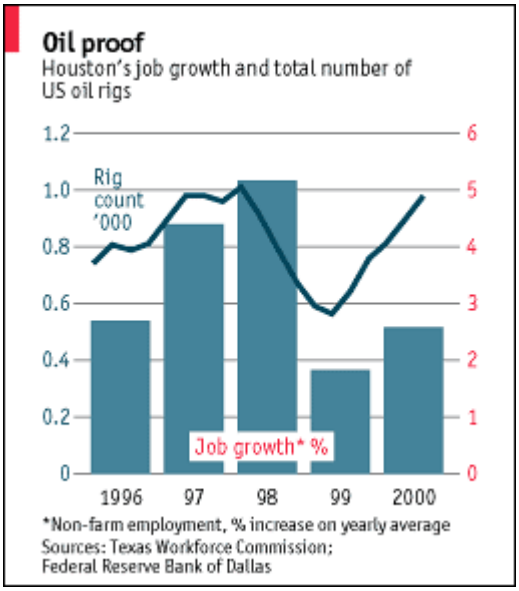
However well-placed Houston is to take advantage of the energy business, it will never be a great city as a one-trick pony. Its boosters point to other strengths:

• **Trade**. Houston is America's second largest port, which is remarkable considering it is 50 miles from the sea.

• **Computers**. The city is home to Compaq, America's third-largest PC maker. If you include Dell, based in Austin, two of America's four big computer firms are in south-east Texas, not Silicon Valley.

• **Space**. The National Aeronautics and Space Administration centre is in Houston, thanks to Lyndon Johnson, a native son.

• **Medicine**. Houston is home to probably the largest medical complex in the world. In a moment of extraordinary optimism, the city set aside 700 acres in the middle of town for medicine. The hospitals, clinics and research centres of the Texas Medical Centre employ 55,000 people and deal with 70,000 patients a day. St Luke's has performed more heart surgery than any other hospital in the world. MD Anderson and the Texas Children's Hospital are among the top two in their respective specialities, cancer and paediatrics.



This list has holes in it. Houston has no real financial services (the mainstay of the biggest global cities) or pharmaceuticals (despite the medical centre). And some of its new industries are less robust than the boosters claim. Its port's success depends on the vagaries of Mexico's economy. Space does not employ many people and is unlikely to grow until the far-off day when the commercialisation of space arrives. The Texas Medical Centre is set up on a not-for-profit basis, so it has not been able to commercialise its activities (hence the lack of drug firms), though a new biotechnology park may help.

In fact, Houston's main hope for diversifying lies not so much in particular sectors as in something intangible: its stunning ability to create new firms. For the past three years, Houston has created more new companies than any city in America. It is almost certainly the best place either to start a business or find a first-time job. The reasons for this are the real driving forces behind its success.

The beauty of entrepreneurialism

The first is unmeasurable—a no-holds-barred optimism of the old school. One survey shows that about two-thirds of Americans agree with the assertion that “if you work hard in this city, eventually you will succeed.” But Houston's figure even at the bottom of the city's recession was 75%, and now it is 88%, the highest-ever, and (says the survey's author, Stephen Klineberg of Rice University) the highest of any big American city.

It may not be true that anything is possible in Houston, but people act as if it were. Bill Gilmer, the chief economist of the Houston branch of the Federal Reserve system, argues that this explains why Houston recovered so fast from the oil bust: unemployed engineers went out and set up their own firms, just as aerospace engineers did in Los Angeles when the end of the cold war put them out of business.

The second advantage is technical. Uniquely for an American metropolis, Houston has no citywide zoning ordinances. When planning decisions are made, they are made by developers on their own land. For the would-be entrepreneur, it is thus easier and cheaper to find a place to set up shop in Houston than in any other city in America.

Lack of zoning laws hands power to developers who insist that new developments be large to capture economies of scale. They expand in leapfrog fashion, ignoring small 20-acre plots near the city centre in favour of vast planned towns further out. This drives land prices sharply down, especially the further you go from the centre. On top of that, an aversion to red tape makes it easy to get building permits. Barton Smith, a land economist at the University of Houston, reckons lack of red tape is at least as important to keep costs low as lack of zoning laws.

Lack of zoning also makes neighbourhoods slightly more mixed—mixed in terms of usage (residential and commercial are more muddled up than elsewhere) and racially. Because there are no zoning laws to force, say, a bankrupt restaurant to re-open as a restaurant, areas change shape quickly. At the same time, Houston is less segregated racially than any other city, by most measures.

One should not be over-impressed by this. Whites in Houston may be more likely than their peers elsewhere to have had a conversation with someone of a different race in the previous week, but that hasn't stopped them heading for the suburbs. Much of the racial mixture downtown is of blacks, Latinos and Asians (the city has America's second-largest Vietnamese settlement after southern California). But because zoning laws do not enable local groups to keep poor people out (for example, by requiring that all housing plots be huge), Houston remains racially desegregated by American standards. This helps draw in immigrant workers, creating a pool of labour.

That leads to the third of Houston's main characteristics which should prove an advantage in the 21st century: racial tolerance. Houston looked like a southern town until the 1970s: white, with a large black minority. A generation later, its population is roughly one-third white, one-third black and (slightly over) one-third brown. Other cities have similar profiles but none went from a bi-racial to a multi-racial city quite so abruptly.

Even more strikingly, it did so peacefully. Houston has not had a race riot since 1914. For the largest southern city to have gone through the civil-rights era and its aftermath without upheaval is a remarkable comment on its politics. Minorities have long been fully or over-represented in the city council, county commissions and the Texas state legislature.

Bob Stein of Rice University argues that, unlike other growing cities, Houston is reinventing the tradition of a powerful group of civic-minded business leaders, the fate of whose companies is closely tied to that of the city. Ken Lay, Enron's chairman, is an example. He has been the driving force behind the building of two sports stadiums, and has a pet project to boost child literacy. Rumour has it that he may run for mayor.

The effect of this sort of civic-minded activism showed up in the late 1990s. At a time when America was busily abolishing affirmative-action programmes, Houston went the other way: it had a new one

approved in a city-wide referendum. For better or worse, this showed how racially tolerant it is.

For how much longer?

In many ways, Houston is thriving because it has kept alive an old-fashioned, industrial mode of growth, built on cheap land, low taxes, immigrant labour and unfettered pro-business policies. This model may not be enough in the next decades.

Houston is ugly. It was hardly charming to begin with and has pulled down many of its old buildings. It may have to pull down even more after recent floods caused $2 billion-worth of damage. It is also, as Al Gore rudely pointed out during the presidential campaign, polluted. Since cities now have to attract skilled workers with “quality of life” benefits, this is a big problem, and not one that can be overcome by cheap housing.

Business leaders are frantically trying to catch up. In an unusual example of bipartisanship, a fervently conservative property developer has joined forces with a former member of the Clinton administration to back a $500m bond issue to plant 1m trees. The Greater Houston Partnership has executed an about-turn on pollution. Having argued last year that new pollution controls damage growth, it is now on a crash course to cut ozone-creating emissions as fast as it can.

If this sudden change of mind is real, it poses a tough question about zoning. Houston has 2,300 people an acre, compared with 6,000 in Los Angeles and 20,000 in New York (at the other end of the scale). This extraordinary extensiveness is expensive. At one point in the early 1990s, Houston alone was spending more on roads than any state except California (and, of course, Texas).

There are doubts about how much further sprawl can go. Three-quarters of the best-paid jobs are still on or within the inner ring road. Some new suburbs are 50 miles away. Can the city continue to burst outwards while attracting the skilled people whose jobs are downtown? And surely that means introducing zoning?

Lastly, Houston faces a severe problem in the one area where its national reputation is high: education. To run his “number-one priority”, Mr Bush picked as secretary of education Rod Paige, a former head of the Houston independent school district. The president claimed, correctly, that Mr Paige had overseen substantial improvements in the city's education, especially among minorities. What he did not say is that these improvements have been nothing like enough.

Despite successes in individual schools, half of all Latinos fail to graduate from high school, compared with 10% of whites and 20% of blacks. Whites are abandoning Houston's public schools. They represent only 12% of pupils; 54% are Latino. More than a quarter of today's schoolchildren are likely to drop out.

In a world where a good job depends on having a college degree, this is alarming. Rice University's Mr Klineberg argues that new immigrants from Mexico arrive lagging further behind the rest of the country educationally than did the wave of immigrants in the early 1900s. The first wave took several generations to catch up. Today's immigrants will have to close a bigger gap more quickly. If they do not, they may end up in an underclass that could scratch at Houston's racial harmony.

This is Houston

Can Houston make it? The city has experienced the three big transformations that affect America in their purest form: the change from a raw-material economy to services; the change from a bi-racial to a multi-racial place; and the moderation of a no-holds-barred pro-business culture to take account of environmental and social costs. Elsewhere, these changes have occurred over 50 years. Houston has lived through them in 20. And the next 20 years will probably be just as dramatic and successful. Hold on to those Stetsons.

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California's electricity crisis

A turning point, maybe

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From The Economist print edition

Federal regulators have imposed price caps on electricity prices

ARE price caps by another name still price caps? That is the question that Californians are puzzling over this week after the Federal Energy Regulatory Commission (FERC), the country's top electricity regulator, voted to impose a form of price control on wholesale electricity prices in 11 western states, including California. Now Democrats, who mostly wanted the caps, and Republicans who mostly did not, are squabbling over whether the current measures count.

By most standards they do. Partial price caps on California had already been imposed by the FERC several months ago; these kicked in only during emergencies. Under the new regulations, these caps will now be expanded to all periods and throughout the entire western electricity grid. Though the FERC ruling contains many complicated provisions, there are two that clearly dictate how power prices will be determined. First, when California's power supply is not at emergency levels, power will be sold at 85% of the price that prevailed at the end of the last such power emergency. Second, power prices will be calculated not by market forces, but based partly on the cost of the least efficient generator.

Why did the FERC, an ideologically polarised group that has been under pressure for months, end up voting unanimously for such controls? Politics rather than logic underlines the four main reasons.

First, the signs that (heavily Democratic) California's power crisis might be spreading to neighbouring (Republican) states led many Republicans in Congress to lobby the White House to soften its stance against any FERC action. Second, George Bush now wants to elevate Patrick Wood, a Texan who has just been confirmed as a FERC commissioner, to its chairmanship. That probably did not please the current chairman, Curtis Hébert, who until this week's decision had always opposed price caps.

Third, the recent shift in control of the Senate to the Democrats has weakened Mr Bush's hand. The new head of the energy committee, Jeff Bingaman, is a western senator sympathetic to price caps. So is Joe Lieberman, who this week held committee hearings on the California crisis designed to embarrass the administration. Last, and most important, Americans back price caps—by a margin of four to one, according to a *New York Times* poll.

Despite this, both sides claim that this week's new regulations are not really price caps. Some Democrats, especially western congressmen, moan that the action falls far short of the "hard" caps they want: they think prices should be explicitly linked to production costs decreed by the regulators, rather than a complicated formula. On the other side of the fence, the Bush administration too has insisted that these are not really price caps, which the president continues to oppose, but rather "a market-based mitigation plan." Quite.

Astonishingly, some of the bitterest enemies in this wrangle have rushed to strike a conciliatory tone. Mr Hébert cooed about it being "time to stop blaming and start problem-solving." The Bush team supported the move, maintaining the fiction that it did not amount to price caps. Leading Democratic Senators, including California's Dianne Feinstein and Barbara Boxer, dropped their calls for legislation on price controls. Even California's Governor Gray Davis, usually the most vitriolic of the lot, praised the FERC decision as "a step in the right direction," though he then demanded that his state be paid $9 billion in refunds for price-gouging by power firms.

Whatever they are called, the FERC actions this week are unlikely to help Californians avoid blackouts this summer any more than real price caps would. However, there is just the slightest possibility that they might mark at least a temporary cooling of partisan slanging. If so, then politicians might, at long last, make some genuine progress fixing the fundamental flaws in the Californian market before things get even worse. Then again, if recent history is any guide, maybe not.

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Environment and development (1)

Oil and cloud-forests don't mix

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From The Economist print edition

Poor countries need economic development, but, like rich countries before them, increasingly dislike the pollution it brings. Two examples, from Ecuador and Peru

"FOUR birdwatchers and a couple of mayors." That is how Ecuador's president, Gustavo Noboa, describes environmental opposition to the route of a new $1.1 billion oil pipeline. The pipeline, already approved by the government, promises to double Ecuador's oil-transport capacity and boost GDP growth by 2.5% a year until 2020. Unfortunately, it will also slice through one of the world's few cloud-forests still intact.

OCP Ecuador, a consortium led by an Argentine-Spanish oil giant, Repsol-YPF, and Canada's Alberta Energy, will build and operate the heavy-crude-oil pipeline that will run 500km (310 miles) from Ecuador's oil-rich Amazon across the Andes to the export docks on the Pacific coast (see map). For most of its length, the pipeline runs meekly parallel to the existing oil pipeline. But one 157 km section, known as the northern route, takes a new path through primary Andean cloud-forest in the Mindo-Nambillo reserve. The area supports over 450 species of birds, almost 5% of the world's total, 46 of which are considered endangered. It also provides jobs in eco-tourism for over 70% of the local population.

Entrix, the American company hired by OCP Ecuador to carry out the environmental study, says that, all things considered, the northern route was the best of the five studied. Environmentalists contend that the company had decided on the northern route from the beginning, and failed to study the alternatives in sufficient depth.

The risk of damage was highlighted last week when landslides ruptured Ecuador's state-owned transnational pipeline, spilling over 7,000 barrels of oil into the Andean forests east of Quito. Since 1998 this pipeline has burst 14 times, spilling a total of 145,000 barrels of oil.

Since the area is prone to landslides and earthquakes, accidents are inevitable, even if OCP Ecuador proceeds as carefully as it has promised. At the least, a corridor seven metres wide and 13.6km long will have to be cleared through protected forest. Environmentalists say this must inevitably mean the building of access roads, and with the roads will come illegal colonisation and cattle grazing. Techint, an Argentine company that is part of the OCP consortium, has already been fined $13,800 by the environment ministry for felling trees in a federally protected forest.

With Ecuador's economy still struggling to recover from its worst period in over a century (GDP shrank by 7.3% in 1999), environmental protection comes low on Mr Noboa's list. It was the energy ministry that had to bestow final approval on the enviromental study, a clear conflict of interest. Days before the study was approved, Mr Noboa said the government liked the route and he would not let environmentalists delay things. "I'm not going to let anyone screw with the country," he said. "I'll give them war."

According to the government, the pipeline will provide 52,000 new jobs directly and indirectly while it is being built and will attract foreign investment of $2.6 billion over the next three years. In a country in desperate need of foreign direct investment and higher exports, and where 52% of the population earn less than $2 a day, only the wildest environmentalists deny the need for the pipeline. They just wish it could go somewhere else.

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Guatemala

“Be careful, very careful”

Jun 21st 2001 | GUATEMALA CITY
From The Economist print edition

Despite a notable case this month, justice in Guatemala remains arbitrary

AFTER this month’s convictions for the killing of Juan Gerardi, the bishop who ran the Catholic church’s human-rights office in Guatemala city, Guatemalans could breathe a sigh of relief. Many doubted that the people who smashed the bishop’s skull with a stone in April 1998, two days after he had published a report on atrocities in the country’s 36-year-long counter-insurgency war, would ever be tried, let alone convicted.

AP

They’ll dispense justice if the government won’t

The murder was an evident reprisal for the report, which—like a later UN-sponsored commission—had found the army responsible for most of the war’s 200,000 deaths. During the investigation, threats made two prosecutors and one judge flee the country for their lives. Despite that, three officers of the army’s elite presidential-security division, the EMP, and a priest were found guilty on June 8th of complicity in the murder and were given jail terms. The next day, however, one of the trial judges got an anonymous telephone call: “Be careful, very careful.”

Unintimidated, prosecutors plan to press on against senior EMP officers suspected of ordering the killing. This could take years but, unless the case is overturned on appeal, it will be an important blow to the army’s impunity. One of those convicted, Byron Lima Estrada, a retired colonel, served a stint as head of military intelligence during the war. No one so senior has ever been brought down before.

Yet only a handful of such cases have been heard. In 1999 members of the Civilian Self-Defence Patrol, the paramilitaries who did much of the counter-insurgency dirty work, were jailed for a wartime massacre. This month prosecutors reopened a case against 15 soldiers acquitted of a 1995 killing. Most ambitiously, two days before the Gerardi verdict, survivors of 11 separate massacres in 1982 launched a genocide case against General Efrain Rios Montt, at the time the country’s military dictator and now the leader of Congress.

For most of the war’s victims, justice is a dim prospect, and not only because of the army’s power. The justice system in general is weak. During the war, says Hugo Lorenzo of the local United Nations’ peace mission, Minugua, the system served to help the state eliminate guerrilla rebels while ignoring atrocities.

Some reforms have occurred since the 1996 peace accords: most notably the replacement of the army-run police force with a civilian one. This has officers in most municipalities—in the past they were rarely to be found outside the 22 departmental capitals—although the new force is riddled with officers recycled from the previous regime. Training and selection are better, too. But the entire law-enforcement system gets a mere 5% of the government’s budget. One in three municipalities does not even have a justice of the peace. The prisons are ghastly: one-tenth of the inmates are held for petty offences that theoretically merit only fines. On June 17th, 78 prisoners broke out of a maximum-security jail, putting the country on alert.

Above all, says Paul Seils of the Centre for Legal Action on Human Rights in Guatemala city, which is helping the war survivors bring the genocide case, the country’s prosecutors are inexperienced, under-financed and vulnerable to threats and political pressure. Just 7% of cases get as far as a trial (though more are resolved by other means), and poor investigation methods mean that many of those fall through. The Gerardi case succeeded only because of the international attention it attracted, agrees its chief prosecutor, Leopoldo Zeissig: “If the accused hadn’t had the spotlight on them, they might have done more things against the prosecutors.”

And although the war's end brought reforms, the disbanding of the civil patrols and military police also created a vacuum, which was filled by a wave of lynchings. About 200 people have been lynched in 337 mob incidents since 1996, according to Minugua. Some stemmed from civil-war feuds; many were summary punishments for suspected criminals. "People often get lynched not for any specific act but because of their reputation," says Paul Kobrak, an American sociologist who has studied several cases. "The Guatemalan justice system never really established the principle of individual responsibility." Likewise, in the few cases where lynchers have been prosecuted, it is doubtful whether they were the real instigators. "The state feels it has to prosecute somebody, and they don't really care who. It's the same as the lynchings."

Changing Guatemala's justice system, therefore, involves changing an attitude of mind. That is hard when it is entrenched at the top of politics. "It's impossible to create accountability and respect for the law if the country's rulers can get away with genocide," says Mr Seils. Or with anything else: last week Luis Rabbe, the communications, transport and housing minister, resigned after an audit confirmed corruption in his ministry. That day he went on television, in a thinly-veiled launch of his presidential campaign for 2004.

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Cuba

Rafting season

Jun 21st 2001 | HAVANA
From The Economist print edition

People leave in all sorts of ways

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EPA

But one came back

ACCORDING to the *Miami Herald*, the balmy weather of the first week of June brought more than 70 Cubans in makeshift boats to the United States. There they were welcomed with open arms. *Granma*, Cuba's official newspaper, has a different tale to tell. Irresponsible American laws are luring Cubans to their deaths. This year alone, 160 "delinquents" have been picked up at sea and returned.

Both stories are right, to some degree. The United States likes to take in Cubans, and keeps 20,000 legal immigration slots for them each year. But they are meant to apply first. Since 1995, many of those who have not applied, but approached on rafts, have been returned.

Still Cubans go on leaving, in their thousands every year. Some go for political reasons, most for economic ones. Tired of the daily struggle to make ends meet, they heed what the authorities call "the siren-call of capitalism".

They find many different ways of following it. Hundreds of Cuban women, and some men, marry foreigners every year: some for love, some not. Many take to makeshift boats, like the 12 doctors and other professionals who asked for political asylum in Haiti on June 6th after they had been shipwrecked. Some defect while working abroad—Cuba, proud of its schools and health services, sends many doctors to Africa and Central America—to reappear in Madrid or Miami. The Cuban media do not report their going.

They also keep quiet about the defections of musicians and athletes. Last month one of Cuba's top salsa singers, Manolin, "the Salsa Doctor", emerged in Miami to say he was not going home. Earlier this month two blind teenage athletes, competing in pan-American games in South Carolina, sought political asylum. A leading sports journalist, Luis Acosta, did the same soon afterwards. His wife said he was being "suffocated" in Cuba.

Yet, as Cuba never tires of pointing out, the most famous recent emigrant eventually came back. June 28th will be the anniversary of the return of Elian Gonzales, now seven, who was plucked from the sea by American coastguards when a raft of emigrants capsized. As the Cuban authorities see it, his story proves the dangers of trying to reach Florida. It shows, too, the false promise of material happiness. Pampered with a bicycle, a puppy and all the electronics he could want, Elian still went happily home with his father. They are now national heroes, living contentedly in a small town in central Cuba. Why, the Cuban authorities will ask, would anyone want any better than that?

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Environment and development (2)

Mining a sour vein in Peru

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Can farms and mines mix?

SQUAT green mango trees stretch in neat rows behind Avelino Juarez, the foreman of a fruit plantation in the San Lorenzo valley in the northern department of Piura. Watched by an eagle perched on a nearby tree, Mr Juarez explains why he does not want the new mine that is proposed for the valley's main town, Tambo Grande. "It's the possible pollution," he says. "I've seen how plants die when they have something rotten nearby." Investors in the 75-hectare (185-acre) estate where he works have shelved plans to expand it, in case the mine goes ahead.

The San Lorenzo valley is a rare place, a green valley on Peru's desert coast. It did not get that way unaided. In the 1950s World Bank money helped to build a reservoir and irrigation system that turned the desert scrub into productive farmland dotted with model towns. San Lorenzo now produces most of Peru's mango exports and a large part of its lime crop. Around three-quarters of all workers in this valley of 75,000 people are employed directly in agriculture, and farms cover 32,000 hectares of the valley floor. The arrival of an open-pit mine extracting gold, copper and zinc sounds like very bad news.

The company behind the mine, Manhattan Minerals of Canada, insists that this will be a modern outfit that will not blight crops or the water supply. It will affect, at most, about 1,000 hectares. Since the deposits sit right under Tambo Grande, about a third of the inhabitants will have to move. But Manhattan says the mine should bring around 500 good jobs, with 3,000 more created indirectly, and annual sales of $60m, compared with the valley's estimated $100m from farm produce.

Manhattan's claims have fallen on deaf ears. An organisation, the Tambo Grande Defence Front, is campaigning to restrict the scale and operations of the mine. When the company began drilling in the town late last year, people set fire to its machinery late at night. In late February a two-day protest by thousands of farmers ended with the trashing of Manhattan's offices and its show-houses.

Manhattan has retreated from those offices, but it has not given up. Tambo Grande is a test case for the expansion of mining outside sparsely populated parts of the Andes. Humberto Montes, the vice-minister of mining, says 400,000 hectares are licensed for exploration in Piura. But if Tambo Grande fails to go ahead, he admits that it will be more difficult to promote mining in the rest of Piura department.

The debate is also about the future of Peru's economy under its new government, which is due to take office on July 28th. Alejandro Toledo, the president-elect, has pledged to tackle the country's serious shortage of proper jobs by promoting intensive farming, food-processing, tourism and building. But mining will still have a large part to play. In 2000 minerals brought in a total of $3.2 billion from abroad, almost half of the country's entire export earnings.

In the next nine years Peru expects a further $11 billion in mining investments, according to the energy and mines ministry. Peru's largest single foreign investment, a $2.3 billion copper-and-zinc concern called Antamina, began trial production at the end of May. Mining also pays around $130m a year in taxes on profits, and several hundred million more in indirect taxes and customs duties.

In theory, mines also enrich the people who live round them. A proportion of the tax paid on profits is sent back to the region and, when profits are high, this can mean a lot of money. (Conversely, when there are no profits, the locals get nothing.) Only this week Congress passed a bill which, if the president approves it, will increase the regional windfall to half of all the direct and indirect taxes and royalty rights paid by the mining company. Even so, the residents of Tambo Grande remain sceptical that their poor schools, roads and services will get any better.

Mines can also leave a trail of pollution. Even the more modern projects, held up as examples of environmentally friendly development, have not escaped opposition or accident. In June last year a truck

travelling from the Yanacocha gold mine in Cajamarca, Peru's most profitable mine, spilled mercury in the village of Choropampa. Residents scooped it up, and dozens were poisoned. The government fined the company around $500,000 and ordered it to clean up the area. Last week residents of the port city of Huarmey rioted against Antamina, claiming that a pipeline carrying minerals to the port would pollute the sea and hurt fishing. The company says no excess water will find its way into the Pacific; after treatment to make it safe, it will be used for irrigation.

In short, the tide of opinion in Peru appears to be turning against mining. Even Antamina, which will have sunk $13m into community projects by next year, has found that people cannot necessarily be softened up to accept it. Carlos Herrera, the energy minister, has said that if the people of Tambo Grande do not want the mine to go ahead, it will not. Yet there is no provison in law to guarantee that. And even the Tambo Grande Defence Front knows that Peru needs the money.

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Thailand

Thaksin gets his day in court

Jun 21st 2001 | BANGKOK
From The Economist print edition

Thailand's prime minister pleaded his case this week in an effort to save his job

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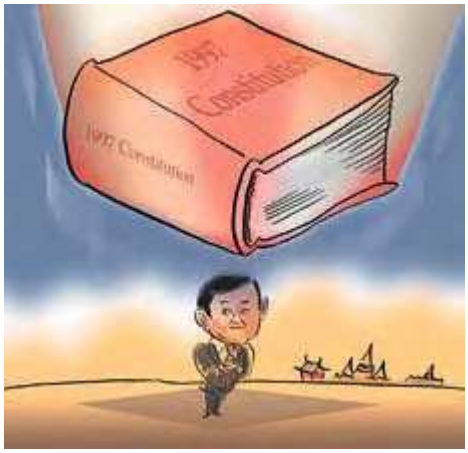

THE prime minister may be the only actual defendant, but Thailand's new democratic constitution is on trial as well. On June 18th a tearful Thaksin Shinawatra appeared before the Constitutional Court on the last day of hearings in a case that may force him out of office.

Thailand's anti-corruption commission indicted Mr Thaksin late last year, days before a parliamentary election, on charges that he had filed false asset statements during a stint in a previous cabinet. He thus became the richest and highest-ranking person to fall foul of the anti-corruption rules enshrined in Thailand's 1997 constitution. Yet, despite that apparent blow to his good name, the voters swept his two year-old Thai Rak Thai (TRT) party into power in January with more seats than any other in Thailand's admittedly brief democratic history.

Now the court, which must ratify or overturn the commission's findings, has to decide how to handle its most awkward task yet. The narrow question before it is simple. When Mr Thaksin disclosed his personal assets as a cabinet minister in 1997, did he knowingly omit several blocks of shareholdings in his media and telecoms empire? Mr Thaksin has already admitted that his asset statement was wrong. The most glaring omissions involved shares worth tens of millions of dollars that were transferred to his domestic servants. If the court finds that he left those out deliberately, the mandatory penalty is a five-year ban from politics. A decision is probably only a few weeks away.

Mr Thaksin and his lawyers have fought back with several defences. They have argued that he earned all his money honestly before he entered government—which, they contend, is the only real point of the disclosure rules; that the undisclosed assets form but a tiny part of the billionaire's wealth; that he gained nothing financially by failing to report them; that the rules were complicated at the time; and that it was anyway all his wife's fault, since she paid more attention to such things than he did.

The Constitutional Court, however, has consistently rejected such arguments in the past. In seven previous cases, it has upheld rulings against politicians who were accused of filing false asset statements. In each one it has dwelt on only two issues: whether the statement was in fact wrong, and whether the accused had a motive for wanting to submit it that way. In Mr Thaksin's case there is a possible motive: one of the anti-corruption outfit's main charges is that, by using his servants as proxies, Mr Thaksin was able to stay below crucial ownership limits in several companies, thus avoiding a host of securities rules. Strangely, Mr Thaksin failed to deal with this charge in his defence.

The indictment accuses him, therefore, of breaking the constitution's guidelines on clean government. Like its neighbours, Thailand suffers from an unhealthy combination of patronage and opaque business activities. These make it hard to distinguish outright corruption from other malpractices, and easier for accused politicians to claim that their case is special. The aim of the constitution is to shed light on the darkness. Politicians must report their wealth fully, allowing the voters to draw their own conclusions and making it easier for graft-busters to spot the worst offenders. Any politician who lies about his wealth frustrates this aim.

Like its neighbours, Thailand suffers from an unhealthy combination of patronage and opaque business activities

What makes Mr Thaksin's case so awkward, however, is that the drafters of the 1997 constitution also set out to fix the other chronic flaw in Thailand's political

system: divided and ineffective governments with hopelessly short lives. They did so by filling a fifth of parliament's seats through proportional representation and by including other rules to shrink the number of parties. The new approach worked as promised, and Mr Thaksin's TRT emerged as the dominant party in a small coalition with an unassailable majority.

So the first election under the new constitution has left its two big ideas at loggerheads. If Mr Thaksin is ejected from office, the first stable government in Thailand's democratic history could be badly hobbled. If, on the other hand, he is acquitted through an inconsistent ruling, the anti-corruption measures may suffer crippling long-term damage.

Though Mr Thaksin took office only four months ago, two aspects of his style are already clear. First, he is undoubtedly an efficient executive, with a sense of urgency that previous leaders have sorely lacked. During his brief stint in office, he has concentrated relentlessly on honouring his four big campaign promises: a debt moratorium for farmers, investment funds directed at the village level, cheap new health services and a centralised agency to nationalise and clean up corporate debts.

But, second, Mr Thaksin has done nothing to promote the idea that independent agencies, checks and balances, or other constitutional safeguards matter to Thailand's future. He has conceded that he must step down if the Constitutional Court says so: Thailand is democratic enough to preclude outright defiance. But he has treated the entire procedure with disdain. His media empire has also been embroiled in controversy, with accusations of biased coverage, prompting many Thais to compare him to Italy's Silvio Berlusconi. His recent sacking of the central-bank chief also seems to fit the pattern.

In short, Mr Thaksin clearly cares much more about results than the procedures that deliver them. His supporters share this view, and have been demonstrating loudly over the past few weeks, urging the Constitutional Court to see things their way. Whatever the court now decides, Thailand's new constitution is about to be sorely tested.

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Pakistan

Prez Pervez

Jun 21st 2001 | LAHORE
From The Economist print edition

General Musharraf appoints himself president

AS CHIEF executive of Pakistan and head of its armed forces, Pervez Musharraf already had titles as impressive as any man could want. On June 20th he added president to the list, casting overboard Rafiq Tarar, the figurehead who had held the title before.

AP

Tarar for now, says General Musharraf

The general had apparently tired of efforts by a faction of the former ruling party—the Pakistan Muslim League of a deposed prime minister, Nawaz Sharif—to cobble together a majority that would vote him into the top job. Under the constitution, the president is elected by parliament and the four provincial legislatures. By appointing himself, the general has dispensed with the need for anything so irksome as finding a majority.

And so the outlines of the system that will follow Pakistan's latest spell of military rule, which began in October 1999, are becoming clearer. General Musharraf's decision to appoint himself president was not unexpected: more surprising was his decision at the same time formally to dissolve the federal and provincial legislatures, which had been suspended but not disbanded at the time of the coup.

On a generous reading, the dissolution of the legislatures could now be seen as part of the preparation for fresh elections and a restoration of parliamentary rule, which, says the Supreme Court, must happen by October 2002. Political parties have so far counted for almost nothing under his rule. General Musharraf blamed them for the mess Pakistan was in before he took over. In power, he has banned them from holding public meetings and arrested their members when they have tried to meet. Candidates in the local elections that have been held in stages across Pakistan have supposedly competed as individuals, though many have in fact been party, or ex-party, men. Now, with more elections in prospect, normal politicking is likely to resume, and General Musharraf is expected slowly to relax his restrictions on public political activity.

But when politicians eventually take charge again in Pakistan, a little more than a year hence, they are likely to find themselves hemmed in. No one thinks General Musharraf will be a purely ceremonial president: mistrust of corrupt and incompetent politicians is his justification for seizing power. The Supreme Court has given him the authority to amend the constitution. He is likely to use it to ensure a strong role for the president and for the army even after civilians return to power.

At the very least he is expected to restore the president's power to dissolve parliament, which was liberally exercised by his predecessors but removed by Mr Sharif. He may add to this the power to dismiss the cabinet alone, which would allow him to get rid of governments without triggering new elections. As a further check, the general is expected to strengthen a National Security Council dominated by the army, which will meddle in matters well beyond security.

Just how President Musharraf will cohabit with a parliament composed of parties that are hostile to his rule is unclear. He has appointed himself indefinitely, but is likely either to seek legislative endorsement for his rule, or to limit his first term to five years once democracy resumes.

It is too early to say whether such arrangements will leave Pakistan better off than it was before the general's coup. Big issues, such as how much power the federal government will devolve to the provinces, are still unsettled. General Musharraf will no doubt say that a strong presidency and a constitutional role for the army are preferable to lurching from democracy to dictatorship and back, as Pakistan has done throughout its 54-year history. Vital policies, such as economic reform and efforts to

counter corruption, will perhaps be shielded from parliamentary whim. But it is difficult to see how anything that could be recognised as real democracy can develop under an indirectly elected president who is unanswerable to any institution in the land.

General Musharraf can now be greeted by India's prime minister as President Musharraf at their first summit, to be held in India, starting on July 14th. He may even elicit a "Mr President" from George Bush if he attends the UN General Assembly in the autumn in New York. But that does not make him a democrat.

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Nepal's economy

In mourning

Jun 21st 2001 | KATMANDU
From The Economist print edition

A country still in shock

THE economy of Nepal, much too dependent on tourism and foreign aid and vulnerable to conditions and opinions in neighbouring India, looks increasing fragile in the aftermath of the massacre of ten members of the royal family earlier this month. Even before the palace killings, Nepal's respected finance minister, Ram Sharan Mahat, was warning of falling tax revenues and soaring debt. This week it was hoped that at least most people would be back hard at work after two weeks of official mourning. But a manufacturer of woollen shawls for export to India said that even those of his employees who had turned up at the factory were not working. "They're standing around, still in shock."

Many people refuse to believe that Prince Dipendra killed his family, despite eyewitness accounts and a government inquiry that says he did. All work stops in the factories, it is said, while the latest conspiracy theory is discussed. Trade unions, affiliated to opposition parties in parliament, are restless and waiting for orders from political masters. The shadowy but influential Maoist militant movement is making critical noises about Indian investment—the largest single source of private foreign money. Non-Indian foreign investment has been negligible this year. The Nepal Stock Exchange, which lists few companies except the country's banks and hotels, saw a mere 296 transactions take place one day this week, despite ten days' lost trading during the period of mourning.

Even a strong industry like brewing may face grim days ahead if beer-swilling tourists continue to stay away. Indians have mostly stopped visiting their tiny neighbour, and Britons, Americans and other foreigners seem to be heeding warnings by their governments to avoid Nepal for now.

The government is hoping to turn things round when it presents a new budget in early July, a month late. The finance ministry, with a nod towards potential investors and aid donors, is talking about restarting economic reforms. But the gloom persists in Katmandu. "It's been a terrible year," says a finance-ministry official. "General strikes, protests, riots, tourism collapsing and this horrible set of murders. How can you set things right with just a single budget?"

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China and Cambodia

Bearers of gifts

Jun 21st 2001 | PHNOM PENH
From The Economist print edition

The Chinese go a-wooing

WHEN Li Peng, China's second-in-command, visited Cambodia last month, his interest in the country clearly extended beyond the wonders of ancient Khmer civilisation and a trip to the ruins of Angkor Wat. His visit, and an earlier one in November by his boss, President Jiang Zemin, coupled with numerous Chinese trade and cultural delegations to the capital Phnom Penh and generous amounts of aid and investment, add up to an intense wooing of Cambodia, designed to expand China's influence in the region.

Since 1997 China has provided Cambodia with $40m in aid and loans of $200m at zero interest. During a visit by the Chinese defence minister in February, $3m was handed over for military use. Cambodia already gets aid from western countries. At a meeting of western donors in Tokyo on June 12th, some $600m in aid was approved. But Hun Sen, the Cambodian prime minister, is said to seek a "balance" between largesse from the West and China. Chinese aid may seem more attractive. Mr Hun Sen has praised the Chinese for not interfering in a country's internal affairs. Western aid tends to be tied to such tiresome matters as good government and protecting the environment.

But is China really the altruistic good fairy? In return for a relatively small amount of money, it has gained great influence in Cambodia. Even at a domestic level this is noticeable in the promotion of the Chinese language and the provision of health care partly paid for by China. More important, China is seeking to counter what it sees as American dominance in South-East Asia.

Something of a test of strength between China and the United States is taking place over a proposed trial in Phnom Penh of former leaders of the murderous Khmer Rouge government. China is opposed to a draft law designed to allow "international jurists"—including, presumably, westerners—to be involved in the trial. Indeed, it does not want a trial at all, fearing that China's cynical support for Pol Pot's barbarous Khmers Rouges would again be publicised. Whereas the Americans support the draft law, China's ambassador in Phnom Penh has exhorted Mr Hun Sen to "defend Cambodian sovereignty".

Cambodia is a member of the Association of South-East Asian Nations, ASEAN, as is Myanmar, whose military government finds favour with China. China is anxious to thwart any development towards a united ASEAN stand over the Chinese naval build-up in the Spratly Islands and the South China Sea. In this aim alone, Cambodia and Myanmar are useful allies for China.

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China's prisons

Some better, most still awful

Jun 21st 2001 | TIANJIN
From The Economist print edition

China is cleaning up its prisons, but there is a long way to go

FROM the outside, it resembles nothing so much as a corporate campus: a neatly groomed courtyard, potted plants lining the walkways, and fresh green lawns that nicely offset the simple red-brick buildings. The perimeter fence, however, is electrified. Inside, placards offer advice such as "Confess your crime and accept reform." Welcome to Tianjin Municipal Prison, a newly built and, by all outward appearances, exemplary jail for convicted murders, rapists and swindlers, as well as a few members of the Falun Gong meditation-cum-exercise sect.

Liu Xuezhong is a Tianjin native who killed a man during a robbery 12 years ago and has been imprisoned ever since. He has been well enough behaved to see his original life sentence reduced four times, and he expects to be out after he has served another six years. Tall, earnest and mild-mannered, he is happy to meet the small group of foreign reporters who were recently allowed a rare look inside a part of China's prison system.

As guards hovered nearby, Mr Liu said all the right things about how he has learned from his grave mistake, how much he enjoys making handicrafts in the prison workshop, and how well he and his fellow inmates are treated. Rewards for those who behave include telephone privileges, points toward sentence reduction and overnight conjugal visits. The prison even gives inmates cakes on their birthdays. According to Song Jinpeng, the deputy director of the Tianjin Prison Administration, prisoners in each of his city's ten prisons enjoy full protection of their legal rights, and the same decent conditions on display in this carefully presented showcase.

If so, Tianjin is something of an exception to the national norm. Numerous other accounts, including some official ones, indicate that squalor, corruption and abuse are commonplace in prisons throughout China. A convict who recently finished serving three years in another prison in northern China for fraud and illegal currency dealing describes a scene that bears little resemblance to the one in Tianjin. Over 20 inmates crowded into each cell, where they competed with each other for meagre rations and sleeping spaces further away from the shared lavatory pit. Beatings by guards were common.

Western human-rights groups routinely catalogue shocking allegations of brutality against inmates, accusing guards of carrying out beatings, attacks with electric prods and torture. Even the president of China's Prison Association this month acknowledged that Chinese prisons are "too isolated from the outside world" and pledged renewed efforts at reform.

Indeed, the Ministry of Justice is already claiming good results in the testing and education programme it launched for prison guards in 1999. And, according to one western diplomat who has been visiting Chinese prisons for ten years or so, results are indeed beginning to show. It is bringing greater professionalism to prison administrators, he said, so that most now seem to know what the regulations require, even if they cannot yet meet them. But it will be a long time before all of Chinese prisons are like Tianjin's.

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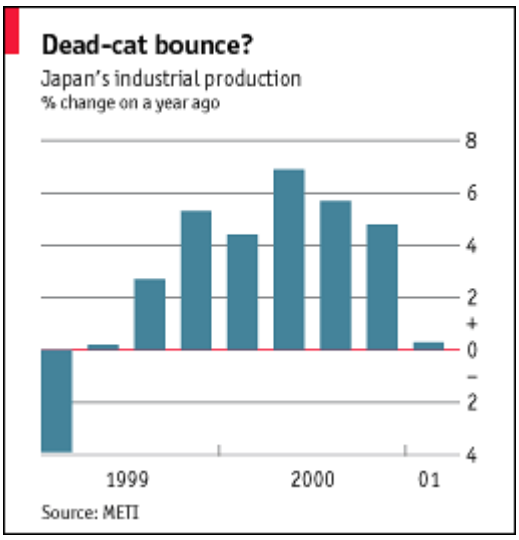
Japan's economy

The politics of pain

Jun 21st 2001 | TOKYO
From The Economist print edition

Junichiro Koizumi pledges economic disaster, and the voters love him for it

NEVER has austerity been so popular. Each week brings news of fresh wounds to Japan's bloodied economy. Exports are falling, company profits have collapsed, manufacturing production is slumping and the stockmarket looks perilously weak. In all likelihood, Japan is already back in recession, for the fourth time in ten years. Yet nothing can touch the prime minister, Junichiro Koizumi, whose popularity rises as Japan's economic fortunes sink. On the contrary, pain is part of Mr Koizumi's pact with the voters.



His economic plans, due to be unwrapped on June 21st, could well push Japan deeper into recession. At their centre sit two pledges: to tighten public spending and to clean up the banks, which labour under a mountain of bad debts. A proper cleansing of the banks, which Mr Koizumi promises to finish in two to three years, will mean doing something about their dud borrowers in the building, property and retail industries. Many companies will have to go bankrupt, putting hundreds of thousands, perhaps even millions, of people out of work. Cutting government spending at the same time will, of course, add to the general suffering, which is why some economists say Mr Koizumi should clean up the banks first and the government's finances later.

But the Japanese must bear the double pain, says Mr Koizumi. Only then will the economy rid itself of its rotten parts. In part, this extraordinary purgative finds favour because of past policy mistakes. The problems at the banks date back ten years or more. Until now, the government has concentrated on promoting economic growth through extra public works, tax cuts and so on. Growth has come, in spurts. But it has not come abundantly enough to bail out the banks, whose bad debts constantly threaten to bring on a full-blown financial crisis. The debts that the government has run up in the meantime, moreover, now threaten to bring on a public-sector financial crisis as well.

While these policies were failing, Mr Koizumi's party, the Liberal Democrats (LDP), split into two camps. One favoured yet more economic stimulus, with reform coming later, if at all. The other fought to tackle the banks and the borrowers first. In the pro-stimulus camp were LDP leaders like Keizo Obuchi, who pursued spending and postponed reform. In the hit-the-banks group sit people like Mr Koizumi.

Tussles over party reform harden the divisions. The pro-spenders see nothing wrong with the LDP's old-fashioned ways. The anti-spenders consider those ways part of the same Japanese disease, money politics. So the anti-spenders are also anti-LDP, which adds to their attraction. As the wildly popular Mr Koizumi puts it: "Change the LDP, change Japan." And so there has grown up among reformers in Japan a whole philosophy of pain. Government spending props up bad old habits, keeping duff companies going and rewarding their sins with plum public contracts. Banks, building companies, property developers, gangsters, politicians and bureaucrats cannot hope to cleanse each other. Corruption binds them in secret ties of interdependence, making the political economy beyond rescue: better to burn down the lot and build again.

It is not just Mr Koizumi who seems to believe in the politics of pain. The opposition Democratic Party pushes shock therapy too. Its policymakers merrily talk about putting 2m people out of work. Journalists and economic pundits cheer them on. To the Japanese ear, there is martial poetry in Mr Koizumi's resolve to suffer—like a samurai warrior's noble death restoring honour to a worthless life. For now, the voters love the sound of it. But modern Japanese are softer than their ancestors, and the real pain has hardly begun.

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Ex-communist Europe

Is democracy working?

Jun 21st 2001
From The Economist print edition

The ousting of one of ex-communist Europe's less bad governments by an ex-king (below) does not mean that the region's democracy is in peril

Reuters

SO A king is back on his throne—or rather he is more or less in charge of his country without actually having a crown plonked on his head, at any rate not quite yet. That alone, in ex-communist Europe, is a remarkable first. The clear victory of the Simeon II National Movement in Sunday's general election in **Bulgaria** was an astonishing feat. Within a few months of the outfit's inception, it had swept past the ruling and reform-minded centre-right coalition of Ivan Kostov, dismissed the challenge of the barely reconstructed communists of the Bulgarian Socialist Party, assured just about everybody that it would seek a corruption-fighting consensus, and sailed to victory with no less than 43% of the votes and about half the seats in Bulgaria's parliament.

Does this mean that a more steady sort of democracy, where kings and communists are both assigned to history's dustbin, has somehow failed to take root in post-communist Europe, and that populism, nostalgia and personality cults are the vogue? Not at all. For sure, it points up the fickleness of electorates in countries that have yet to recover from the double bashing of communism and its collapse. It suggests that quite a few voters can be swayed by politicians with thin records promising the earth. And it shows how hard it is for reforming governments to win re-election if they have inflicted necessarily harsh medicine on their voters, even though they may have set their country on the road towards a recovery that cannot be instant. But the record, across a swathe of ex-communist territory, from **Estonia** in the north down at least to Bulgaria in the south, suggests that democracy is well entrenched and that the wackier and nastier sorts of populists, with a few exceptions, have little support.

Roughly speaking, the worse the economy, the bigger the chance of political upheaval and mayhem under mavericks: by that measure, Bulgaria risks being wobbly for quite a while. The ex-king's victory may yet turn out to be a populist protest that fails to lead to more solid reform. Bulgaria and **Romania** are certainly the economic laggards of ex-communist Europe outside the former Soviet Union, and excluding Albania and the war-ravaged bits of ex-Yugoslavia. So it would be odd if they were not, in politics, pretty unstable.

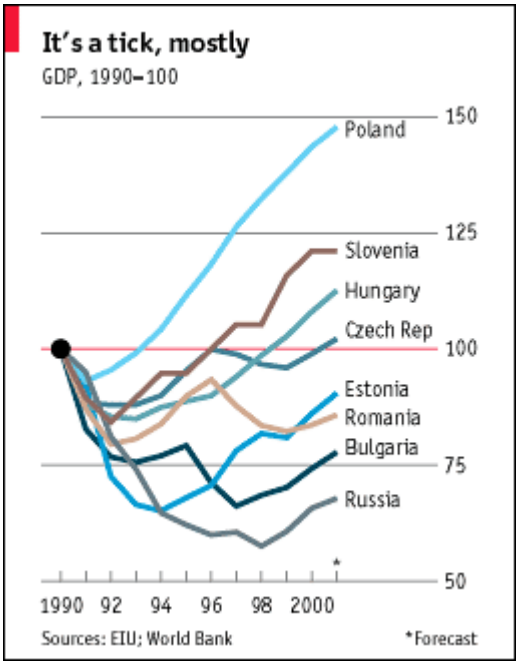
Romania, in fact, is the least impressive of the pack, though it should, with 23m people and plenty of natural wealth, be one of Central Europe's leaders. Its economic reform has stalled again and again. It has re-elected as president an ex-communist, Ion Iliescu, who served at the elbow of one of the region's ghastliest dictators, Nicolae Ceausescu. And it has one of the strongest populist parties, in the shape of Vadim Tudor's Greater Romania party, a xenophobic lot who heap abuse on Gypsies and ethnic **Hungarians**. But even there multi-party democracy underpinned by fair elections looks secure.

Bulgaria, though economically creaky and more corrupt than most other ex-communist countries, has done a bit better than Romania of late. Mr Kostov had earned plaudits from the European Union and the World Bank for plugging on with economic reform. But he had failed to better the lives of enough Bulgarians, nearly a fifth of whom have no jobs. Hence the thirst for something new (or, in the person of a 64-year-old king, something old).

Simeon has some bright young men whom he has lured back from investment banks in London and elsewhere. He may well

press on with most of Mr Kostov's policies, and perhaps be lucky enough to see some of them bear fruit "within 800 days", as he has boldly promised. But continuing to sell off rusting state assets could upset many of the workers who voted for him—by chucking them out of jobs. And his group includes some rum folk who may not prove much cleaner than some of Mr Kostov's lot.

Nor is it yet clear what job the ex-king will have. He says he does not want the crown back. He may not choose to be prime minister. He will presumably pull a lot of the strings, whatever his title. In any event, the voters' delight may not last for all of those 800 days. Bulgaria is still not far off being a basket case.



Cheer up, all the same

But a pattern has emerged in the rest of post-communist Europe that is on the whole encouraging. Admittedly, most countries that were once part of the Soviet Union are not doing so well. Except, that is, for the three Baltic countries, which have managed to get out from under the Russian shadow. Estonia, in Finland's backyard, is now almost an honorary Nordic, while **Lithuania,** which lost a prime minister this week over a row about taxes and privatisation, has nudged closer to Poland. Exclude, too, the bloodier bits of the Balkans, though **Slovenia** has successfully debalkanised, resurrecting itself as a modern offshoot of **Austria**-Hungary. And once-wretched Albania has begun to bounce back from rock bottom, leaving ex-Soviet **Moldova** at the foot of the poverty league.

Building, steering and sweeping

Country	Reform progress	Stability	Clean government
Bulgaria	⚒⚒⚒	❄❄	🧹
Czech Republic	⚒⚒⚒⚒	❄❄❄	🧹🧹
Estonia	⚒⚒⚒⚒⚒	❄❄❄❄	🧹🧹🧹
Hungary	⚒⚒⚒⚒⚒	❄❄❄❄	🧹🧹🧹
Latvia	⚒⚒⚒⚒	❄❄❄	🧹🧹
Lithuania	⚒⚒⚒	❄❄	🧹🧹
Poland	⚒⚒⚒⚒	❄❄	🧹🧹
Romania	⚒	❄	🧹
Slovakia	⚒⚒⚒	❄❄	🧹🧹
Slovenia	⚒⚒⚒⚒⚒	❄❄❄❄❄	🧹🧹🧹🧹

Source: *The Economist*

Indeed, the economies of post-communist Central Europe, after sinking into degradation in the first five years or so after communism collapsed, are beginning to perk up; and their political systems are looking quite solid too. Nasty populists in **Slovakia**, in the shape of Vladimir Meciar and Robert Fico, are still getting too many votes. In Hungary Istvan Csurka's xenophobic Justice and Life Party may yet wield influence in a coalition (see article). And Romania's Mr Tudor still wins votes. But populists elsewhere have done pretty badly—witness the flop of populist ranters such as **Poland**'s once-buoyant farmer, Andrzej Lepper, who took only 3% of the vote in the last general election.

However, two of the biggest banes of post-communist Europe remain in place. One is corruption, which still weakens the framework of newly reintroduced capitalism. The other is the failure of pro-market reformers to persuade voters that future prosperity is worth the present pain. It was disgust at both of these defects that helped bring Bulgaria's ex-king to power.

It is the inadequacies of the pro-market politicians that have been responsible for the fact that virtually no radically reforming government has won consecutive terms of office in ex-communist Europe. One

arguable exception is the Czechs' Vaclav Klaus, less radical than he sounded, who was brought down by the sleaziness of his friends. Another is Janez Drnovsek, Slovenia's cautiously reforming prime minister, who lacks radical zeal but senses how fast his people would like to go. A near-exception is Estonia's Mart Laar, whose radical reformers were chucked out after their first zealous spell in office but came back (and are still there) after electoral humiliation and a soul-searching hiatus. A possible next mould-breaker? It could be Hungary's abrasive right-winger, Viktor Orban.

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Hungary's next government

A second term for Orban?

Jun 21st 2001 | BUDAPEST
From The Economist print edition

That may depend on radical nationalists

HE'S young, slick with the media, anti-socialist, but is becoming ideologically more ambiguous: a more abrasive version of Tony Blair, say some Hungarians of Viktor Orban, their prime minister. Can he break Hungary's post-communist mould next spring by winning a second term in a row? Mr Orban's Fidesz party, seen by its foes as an arrogant young clique, has trailed behind the opposition Socialists for most of the years since the last election, in 1998.

Yet win he may. The feuding Socialists, bypassing their party leader, Laszlo Kovacs, have picked a new challenger: Peter Medgyessy, finance minister in the later years of the Socialist-led coalition that ruled from 1994 to 1998, but not even a party member. His acceptance speech suggested more of the pro-market policy he pursued in office, with some nationalist touches to please the (ex-communist) Socialists' crustier wing. But can he end the bickering that has been undermining the left and persuade the last Socialist prime minister, Gyula Horn, to stop sniping at his own side?

Fidesz, meanwhile, has drawn level in the polls. And it plays the nationalist card a lot more convincingly than the Socialists do. On June 4th, the 81st anniversary of the treaty that cost Hungary two-thirds of its area after the first world war, a government minister attended the consecration of a bell that will toll in daily lamentation. The government is also busy lobbying on behalf of ethnic Hungarians in the lost territories.

And Mr Orban, Blair-like too, likes banging two drums at once. He proclaims support for entrepreneurs, yet urges party members to play up such Fidesz policies as dishing out credits for families, shoving up the minimum wage and abolishing university tuition fees.

Much may depend, after the election, on the radical, nationalist Hungarian Justice and Life Party (MIEP) and its fiery leader, Istvan Csurka. Fidesz's current ally in government, the Independent Smallholders' Party, took 14% of the vote in 1998 but has been wrecked by corruption scandals. The centrist Alliance of Free Democrats and the conservative Democratic Forum are also both in poor shape. So the new parliament may contain only Fidesz, the Socialists and the arch-nationalists of MIEP.

Mr Csurka might then emerge as as kingmaker. Would Mr Orban accept a coalition with such a populist? On this, he and his party blow hot and cold.

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Caviare

None left for the general

Jun 21st 2001 | MOSCOW
From The Economist print edition

Desperate measures to preserve the Caspian's dwindling sturgeon

GREED plus desperation times ignorance equals extinction. That is the miserable equation facing the world's most lucrative fish, the sturgeon, which used to throng the Caspian Sea and is now dying out. Trade in its eggs—caviare—is worth hundreds of millions of dollars a year. Poachers now use satellite technology to fix the position of their hidden nets and automatic weapons to deal with the feeble fisheries police. The haul from a single sturgeon can be worth more than a month's wage.

Did you order the poached eggs?

Catches have fallen 30-fold over the past 20 years, mainly because of overfishing. An international body that protects rare animals, CITES, which is meeting this week in Geneva, has backed away from outlawing caviare exports altogether from Russia, Kazakhstan and Azerbaijan, the three big Caspian culprits. Hopes for saving the wild sturgeon now rest, precariously, on mandatory labelling, making it possible to identify the caviare's source. That should make it harder for the poachers to get their loot into respectable shops and restaurants abroad.

In theory. Faking is an established industry in Russia, as western companies know to their cost. Russian restaurateurs and their customers are not ardent conservationists. Caviare smuggling, often via Turkey and Dubai, is rampant. The new labels will probably just mean an extra obstacle for poachers. Still, better international scrutiny has dented illegal exports a bit. And that is where the real money is made: a tin of caviare that costs $100 in Moscow fetches more than ten times as much in London.

The big winners are canny western sturgeon farmers like Sandro Cancellieri. He plans to triple his caviare production to ten tonnes a year by 2005. At that rate, his eco-friendly farm in Lombardy will alone produce more than twice Azerbaijan's entire annual output.

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Charlemagne

Jack Lang

Jun 21st 2001
From The Economist print edition

Cool cat, France's education minister

IT IS easy to deride him: the bouffant hair, the film-star smile, the dandy clothes that are just a touch too fashionable, snipe his critics, for a 61-year-old grandfather who is meant to be a serious politician. So why do opinion polls constantly rate Jack Lang, France's minister of culture for most of the 1980s and early 1990s and now, for the second time, its minister of education, above most of his colleagues?

One reason is a date: June 21st, the summer solstice, which France celebrates with the *fête de la musique*, a sort of national street party in which musicians, good and bad, perform unpaid until long past midnight. Even Lionel Jospin, the famously straitlaced prime minister, is persuaded to let his hair down: this week the prime-ministerial gardens were opened to let the public chill out to jazz from the Didier Lockwood sextet. Last year it was Les Négresses Vertes who wowed the crowd with an eclectic mix of rock and folk. And who dreamed up the *fête*? Mr Lang, as culture minister to President François Mitterrand back in 1982.

Nostalgia reigns

There is, however, another, less obvious explanation for Mr Lang's popularity. Just as British and American baby-boomers revel in the nostalgia of the 1960s—Vietnam, flower power and the Beatles—so do French ones, recalling the iconoclastic songs of Serge Gainsbourg and the student uprising against de Gaulle and his regime in May 1968. Somehow, almost by virtue of his appearance and easy liberalism (for "radical chic" read "*gauche caviar*"), Jack Lang connects a whole generation with the spirit of 1968, when today's baby-boomers were young idealists. And he does so without alienating today's rap-chanting young: it seems they admire him as much as their parents do.

Yet what else does he stand for? In France as elsewhere, politics today centres on personalities rather than ideology. But ideas matter. Does Mr Lang have any? Or is he simply adept, as one critical Socialist puts it, at "navigating the current"? Certainly, six times a minister, he was more buoyant than most during the over-long era of his mentor Mitterrand. Indeed, his last role in that period was to replace Mr Jospin as minister of education—proof, say his enemies, that while Mr Jospin was keen to distance himself from the court of the Machiavellian Mitterrand, Mr Lang preferred to go with the flow, no matter how murky.

Maybe, but at least he is as yet unstained by the scandals still spreading from those days. In contrast, other Mitterrand favourites have fared badly. One such, Jacques Attali, who became the first, quickly discarded, head of the European Bank for Reconstruction and Development, is being quizzed about dubious African arms deals. Roland Dumas, a long-serving foreign minister, faces a prison term for corruption involving the then state-owned oil company, Elf-Aquitaine (and this week reinforced his appeal against the verdict by claiming that Hubert Védrine, the present foreign minister, and Elisabeth Guigou, the employment minister, knew of Elf's activities when they too were part of the Mitterrand court). Even the Protestant-pure Mr Jospin is in trouble, admitting to having lied about a Trotskyite past.

Part of Mr Lang's popular appeal is precisely that his ideas are not overweight with ideology: remember the 1960s for their cultural liberation, he might be saying, not their political stridency. Between his law studies in Paris and his first elected post, in 1977, as a Paris councillor, he practised as a lawyer, taught law at university and—his real pride—created a festival of experimental theatre in Nancy and directed the National Theatre of Chaillot in Paris. What French baby-boomer can resist a politician who once solemnly assured parliament that "the French have crossed the frontier separating darkness from light", and who has often campaigned to save Americans on death row (George Bush has been a repeated target, most recently for the execution of Timothy McVeigh)? What young person can resist a minister who once lauded the artistic value of graffiti, and who criticises colleagues for wanting to regulate rave-parties?

More to the point, what hard-pressed prime minister could resist hoping that Mr Lang's popularity will prove infectious? It is just over a year since Mr Jospin plucked Mr Lang, no particular pal, from the chairmanship of the National Assembly's foreign-affairs committee, where he talked hot air, to replace Claude Allègre, the prime minister's "friend of 40 years", at the education ministry. Mr Lang, bored with his parliamentary post, had been hoping to be the Socialists' candidate as mayor of Paris. Instead, he was happy, like Laurent Fabius at the finance ministry, to be a Mitterrand-era heavyweight brought back to the government, as Mr Jospin put it, "to reinforce its capacity to act."

So far, it has worked. Where Mr Allègre stirred the waters, Mr Lang has calmed them. Demonstrating teachers (and students) have gone back to the classroom, mollified by the Lang touch—and by pledges of extra pay for teachers ready to stay in "difficult" schools, and of a livelier curriculum (including, controversially, time for France's regional languages) for the students.

Future uncertain

Mr Lang's prospects, however, are far from clear. His popularity is great, but not irresistible: in France's local elections three months ago, when more than one set of voters turned against politicians "parachuted in" from Paris, Mr Lang, mayor of Blois since 1989, managed to lose that post, albeit by only 37 votes. "That's democracy," he said philosophically, though not without adding that the National Front, always a foe of the Jewish Mr Lang, had conspired in his defeat. Moreover, Mr Jospin needs popularity by association only until the presidential election next May. Mr Lang is hard-working and ambitious (his wife even more so), but he has no party faction behind him. He knows full well that for a hypothetical President Jospin the echoes from the *fête de la musique* could die away extremely fast.

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The EU summit

Cheap date

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Stirring words bring eastern countries no closer to membership than before

IN THE Soviet Union people used to joke, “We pretend to work and they pretend to pay us.” In the curious relationship between the European Union and the 12 countries applying to join it, the Union’s current motto seems to be, “We pretend to make a breakthrough and they pretend to believe us.”

A churlish reaction to the declarations on the enlargement of the EU that were made at the end of the Gothenburg summit on June 16th? No doubt Goran Persson, Sweden’s prime minister, felt that he had achieved something real; and many of the applicant countries seemed genuinely pleased with the summit’s outcome. Yet a close examination of the formal conclusions suggests that any advances for the cause of EU’s expansion rest in tiny nuances of language of the sort that would delight a Talmudic scholar.

Those who say that the cause of bringing in some new members has truly advanced claim three changes. First, “a date has been set”: the summiteers declared that negotiations with the best-prepared applicant countries should be concluded by the end of 2002. Second, the current members set the objective of enabling the top applicants to take part in elections to the European Parliament due in 2004. Third, the summiteers declared that enlargement is “irreversible”.

All this may sound encouraging. But none of it is really new, and the declarations are all hedged with conditions and weaselly escape-clauses. The prospect of “concluding negotiations” by the end of 2002 had already been laid out in a “road-map” for enlargement set out by the European Commission, which is conducting the negotiations. And indeed it was made clear at Gothenburg that concluding negotiations in 2002 is not a promise—which really would have been an advance on the road-map—but is still conditional on the negotiations’ actual progress. Similarly, the goal of letting some new members take part in the 2004 elections was stated at the end of the Nice summit in December. It was then said to be a hope; now it is “an objective”. But, as Germany’s chancellor, Gerhard Schröder, quickly made clear, “It’s an objective, not a commitment.”

As for that declaration about “irreversibility”, it has a ringing sound—because it is hollow. The EU leaders are in no position to guarantee that enlargement will happen. Even assuming that the negotiations can be completed by 2002, the treaties would still have to be ratified by every parliament in the Union, and would be subject to referendums in many of the applicant countries. As Ireland’s recent vote on the Nice treaty demonstrated, such things cannot be taken for granted.

Given all this, why did the EU leaders and the applicant countries herald the Gothenburg statement as a “major breakthrough”? The answer is that the Irish rejection has shaken confidence in the enlargement procedure on all sides. The leaders of the EU’s governments wanted to reassure the applicants; and the applicants wanted to be reassured.

For sure, some strides have been taken towards enlargement, but hardly thanks to events in Gothenburg. During the six months in which Sweden held the EU’s agenda-setting presidency, things did move along, even in some boggy areas—for instance, over free movement of labour and capital. But the stickiest topics—farming subsidies and aid to poor regions—are still untackled. Only when the EU grapples head-on with such issues, in the first half of next year, will it become clear if it is realistic to expect some countries to close a deal by the end of 2002.

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Riots at the EU summit

Visigothenburgers

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The rioters did make the leaders look more remote

HAVING a city trashed by foreign anarchists would be hard on any country. But it seemed particularly tough on the Swedes, who pride themselves on their peaceable nature and tolerance. The very place names in Gothenburg breathe well-intentioned internationalism: Esperanto Square, Olof Palme Place, after its third-world-minded prime minister assassinated in 1986. But, by the summit's end, scarcely a bank or a Burger King in the city had its windows intact. After the first day of rioting had wrecked Gothenburg's main shopping street, the police moved hundreds of containers up from the docks to block all the major thoroughfares. The Swedes had hoped to show off their second city. But many of the delegates spent their time cowering in the conference centre. And even those who ventured out found it hard to negotiate their way round the blockades.

AP

Engaging in debate

Although most of the European leaders gathered in Sweden roundly condemned the idea that the violent demonstrators had anything useful to say, the riots, combined with the Irish referendum, did help feed a feeling that the EU is increasingly out of touch with popular sentiment. All EU leaders now talk earnestly of having to engage ordinary people in debate and enthuse them about the Union's future.

But this debate will clearly have limits. There is something faintly Orwellian about the constant statements that "the Irish referendum must be respected", when it is patent that the EU's leaders are determined to reverse or circumvent the Irish rejection of the Nice treaty. Many of the ideas for "engaging ordinary people" seem doomed. The convention that produced last year's EU Charter of Rights is frequently cited as a model of good practice. But how many Europeans even know the charter exists? And can a consultation exercise made up of a few national politicians, some lawyers and an Internet site really be called a "Europe-wide debate"?

Other ideas seem even more far-fetched. Hans Eichel, the German finance minister, is the latest European grandee to come out in favour of a directly imposed EU tax as a way of making the workings of the European Union more open and less mysterious. But if ordinary people notice a deduction on their payslips marked EU, is that really going to make the Union more popular? You need to have been locked up in a convention centre for a very long time to believe that.

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Immigration into Germany

More needed, fewer wanted

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The economy would welcome more foreign workers. Not so the citizens

DO THE Germans need any more to put them off the foreigners in their midst? International organised crime, Jürgen Storbeck, director of Europol, told a recent conference in Berlin, is no longer lurking at Western Europe's gates; it is already well dug in. The Balkans—over 1m of whose citizens live in Germany—are now a big source of organised crime, he said, with gangs from the area using migrants, legal or illegal, to help them. And increasingly, he said, these gangs are led by young, well-educated men, the sort you find in Germany "among second- or third-generation Turks and Albanians".

Since 1955, more than 30m outsiders have flooded into Germany, 10m of them in the past decade. Most went home again, but some 7m, including 2m Turks, are still there—9% of the population. In addition, 3m ethnic Germans have come from the former Soviet Union. Now the natives are being told that, for sundry worthy reasons, they must accept even more. They do not like it, especially when nearly 4m people are without jobs.

The opposition Christian Democrats have always pretended that "Germany is not a land of immigration". Even they, in a party document adopted this month, now accept that "controlled" immigration is needed to meet the demand for skilled labour. (EU citizens face no controls.) But they have sweetened the pill by demanding tighter rules for groups already allowed in, mainly asylum-seekers and relations of existing immigrants—for instance, by lowering the top age for admitting related children from 16 to six.

An official commission set up last year is said to be about to recommend radical changes in the law to allow in more foreign workers. A long-standing taboo was broken last year by a "green card" scheme to admit up to 20,000 computer experts. The commission, it seems, will go much further, proposing to admit highly skilled workers, whether or not they have a job waiting, for an unlimited stay; and less-qualified ones, for limited periods, in areas that have lots of jobs and far too few qualified Germans to fill them. For each category, an upper limit of 20,000 a year is proposed at first. Businessmen want far more. But the commission, like the government, presumably wants to soften up public opinion before going further.

Well it might. Over the past five years, net immigration has averaged around 200,000 a year. Two Germans in three, say pollsters, already feel that too many foreigners are arriving. The EU's enlargement, they have been told, may at first add a further 200,000-300,000 a year. "Millions" more, supposedly, will be needed as the native population shrinks over the next 50 years. And now still more—or so it seems to ordinary people already bewildered by the figures—are needed to keep the economy growing and welfare alive.

Achtung!

Germans are afraid—for their jobs, their homes, their security, their very identity. They needed no Mr Storbeck to point out the link between immigrants and crime: are not 30% of Germany's jail inmates foreigners? The broader fears may be irrational but they are real. Xenophobia is up. Reported violence against foreigners jumped by a third last year.

That is why Germany is insisting on a seven-year transition for the free movement of labour when the EU expands to the east. It is also why the ruling Social Democrats have become nervous about relaxing immigration laws before next year's general election.

Yet the government plans to legislate this autumn. Otto Schily, the interior minister, has given a nod to the commission's leaked main recommendations. Eager to prevent this becoming an election issue, he is bidding for consensus with the Christian Democrats; he "broadly" agrees with their proposals, he has

said. But the Christian Democrats want none of it. They see a wide gap between his ideas and theirs, and may be happy to exploit it.

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British productivity

Hunting the snark

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If Mr Brown does preside over an upsurge in productivity growth, it will mainly be a rebound from the dismal performance in Labour's first term

IT IS a quest on which chancellor upon chancellor has embarked since the war—to little avail. Now it is Gordon Brown's turn. Launching his plan this week to promote enterprise and to open up business to more effective competition, the chancellor said: "From today, our energies must be directed to productivity."

Mr Brown wants to raise the rate of growth of labour productivity—output per worker. It is easy to see why. While output can be boosted in the short term by higher employment, in the long term faster productivity growth is the passport to greater prosperity. An upsurge in productivity growth would let the chancellor off the tax hook when his hoard of budget surpluses is exhausted in a couple of years' time. It would allow him to carry on raising public spending at a fast rate without having to raise the tax burden.

But the chancellor's quarry is an elusive one. In Labour's first term, productivity growth fell back rather than improving. The deceleration in Britain stood in marked contrast with America, where productivity leapt because of the spread of information technology (although it was also exaggerated by a financial bubble). That left Britain with an even bigger productivity gap with America, where output per worker is more than two-fifths higher. In France, it is a fifth higher.

In principle, closing these gaps should be eminently possible as best business practices and technologies spread easily across borders. In practice, catch-up has been slow and difficult. In the past 20 years, Britain has stopped slipping down the productivity league—the depressing record of the earlier post-war period—but it did little to claw back ground from its European neighbours.

One important reason for the productivity gap is that Britain's workers have less capital equipment. Because the stock of capital is much bigger than total annual output, it takes a long time for investment to deal with such a shortfall. During the late 1990s, capital spending by business has been robust but this has been offset by low government investment. Despite all the rhetoric, the actual record of Labour's first four years in office was the lowest net investment by the public sector as a proportion of GDP since the war. One clear result has been a dramatic worsening in an already overstretched transport system. Clogged-up roads, tubes and airports brake productivity as well as mobility.

But even if Britain could eventually match American and European levels of capital per worker, that would still leave a significant productivity shortfall. According to Nicholas Crafts of the London School of Economics, the gap has two further sources. Britain lags behind European countries in the skills and expertise of its workforce. And it is a less dynamic and innovative country than America.

Britain's skills record is patchy. One encouraging augury is that Britain has made impressive gains in the past 15 years in the proportion of young people going into higher education and getting a university degree. Public spending on education is also now set to rise fast. However, past failures in education are still affecting productivity through skills deficiencies in the working-age population. Britain scores woefully high in international comparisons of the proportion of the population lacking functional literacy.

Matching America's record on innovation will also be difficult. New-world entrepreneurialism is a distinctive culture that cannot readily be transplanted to an old-world country like Britain. In any case, America's success in product innovation is also rooted in the strength of its science base and higher R&D spending by business. As a result, America files far more patents per head of population than Britain.

These roadblocks suggest that a sustained improvement in productivity growth will prove at best modest, at worst as elusive as ever. Yet there are good reasons to expect an upsurge in the immediate future. For one thing, Britain should be able to emulate at least some of America's achievement in enhancing productivity through the use of information technology. Recent levels of investment in IT hardware and software in Britain have matched America's performance.

Furthermore, the recent deceleration in productivity growth in Britain is in part the flip side of a welcome improvement in the labour market. Unemployment has tumbled to 25-year lows without setting off a surge in inflation. Between 1996 and 2000, the number of jobs in the workforce grew by 1.6m. The downside for productivity is that new entrants into employment tend to be initially less productive than existing workers—by between a third and a half, according to the Treasury. This has temporarily depressed the rate of productivity growth. However, this effect should wear off as the new workers become more experienced and the increase in employment tapers away.

Another reason to expect a bounceback in productivity growth is that much of the recorded slowdown has been concentrated in manufacturing, the part of the economy where productivity usually grows most rapidly. Manufacturing output per head hardly increased at all from 1995 to the start of 1999 as the exporting companies that dominate the sector struggled to adjust to the soaring pound. But in the past two years, manufacturing productivity has recovered sharply, growing by over 5% a year. As it has recovered, so has productivity growth for the whole economy.

That impetus is faltering for the moment as manufacturers are hit by the global economic downturn. But a pick-up in Britain's productivity performance still remains quite likely in the next two or three years. If it does materialise, the chancellor will no doubt claim credit for his reforms. He should beware. The last chancellor to boast of an economic miracle was Nigel Lawson: it turned out to be a mirage. So with Mr Brown: he could find that his snark turns into a boojum.

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Prostitution

SoHopeless

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Albanian organised crime dominates prostitution in Soho

"I'VE seen girls with bruises, they come in with stitches, black eyes, you name it," the pimp says. He points out the dull redbrick block of flats, round the back of Piccadilly Circus in central London, where he claims prostitution organised by Albanian gangs is based. He claims the sex workers, brought into the country illegally, have to pay the men who control them £420 a night. If they don't make the money, they face physical abuse.

According to an internal Home Office briefing, Albanians or Kosovars now control "around 70%" of massage parlours in Soho. That ties in with a report last year by the National Criminal Intelligence Service, which noted a long-term threat from organised Albanian gangs who run immigration and prostitution rackets across Western Europe.

Both small "entrepreneurs" and large, organised groups traffic people through Europe, and most of such activity stems from the Balkans. Years of war there have meant desperate poverty for many, whilst simultaneously weakening law enforcement in the region.

The result is that, while some women are abducted, many more are simply deceived by promises of employment and independence. Once in Britain, their pimps typically demand repayment of "debts", and use violence to force them into prostitution, while pocketing most of the proceeds.

"Women are a safer commodity than drugs or guns. The risk of imprisonment is far less," says Julie Bindel, an academic who is researching trafficking for the Department for International Development. She claims that the off-street sex industry is barely monitored in Britain, despite its increasingly violent nature. Moreover, since the prostitutes are deported before their pimps can be prosecuted, the immigration law "plays into the hands of the traffickers".

Paul Holmes, who heads the Metropolitan Police's Vice Unit, agrees that the women suffer enormously, but resists the idea that the law is unhelpful. "A blanket provision for victims of traffickers to remain in the country might make it even harder to detect genuine victims," he says. His unit has instead used current "leave to remain" provisions in certain cases, alongside large-scale arrests of workers. However, it has faced criticism for failing to prosecute the ringleaders.

But there is often little the police can do. They say that immigrant sex workers refuse to testify because the gangs threaten reprisals against the women's loved ones. Since these groups operate internationally, the British police cannot protect the families of the workers. They are powerless against such intimidation.

One organisation rejects the Home Office briefing. A group called the English Collective of Prostitutes dismisses it as "the latest fabricated story aimed at justifying a police clampdown" and dubs it "lies".

Mr Holmes demurs. "All our intelligence and evidential experience is that these women are being used, effectively as sexual slaves, by ruthless, exploitative pimps," he counters. Tackling prostitution is harder than ever. But it is not the sex that is the problem. It is the slavery.

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Missionaries

Green and pagan land

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The developing world's missionaries have turned the tables on Britain

ON JUNE 15th, the Swahili Furaha Choir beat its tom-toms down the aisle of St Paul's Cathedral and ululated beneath its golden mosaic dome. Behind marched the bishops of churches from 160 nations, celebrating 300 years of Anglican mission. But the missionary business has changed since the United Society for the Propagation of the Gospel (USPG), the missionary wing of the Church of England, was set up in 1701 "to convert the heathen of all races". With Church of England attendance dipping below a million, the converts are returning to conquer Britain. "London is today's field of mission," says Glaucos Soares de Lima, the Anglican primate of Brazil. "It's so secular we have to send people for their salvation."

Most of the world's 73m Anglicans live in the developing world. Recruiting vicars in Britain is increasingly difficult, so there is demand for the missionary skills that the developing world is keen to supply.

The USPG recruited Francis Makombwe from the Zambian village of Mzenje to be their missionary for Waterloo. Today he is the vicar of Hatcham in south London, and has cajoled his parish into singing at least two African hymns each Sunday. He is not a one-off. The Archdeacon of Croydon and the bishop of Stepney are both from Uganda. The vicar of West Dulwich comes from Ghana.

"Zambia has been at the receiving end of mission for the past 300 years," says Father Makombwe. "Now it's pay-back time." He is, he hopes, more culturally sensitive than the white missionaries who bashed their bibles through Africa. But he says he has a responsibility to share Africa's vibrant spiritual life with moribund Britain, where most people say they have no formal religion.

Not all are content at such Africanisation of that pillar of the establishment, the Church of England. Fellow evangelists have refused to take him round knocking on doors. Father Makombwe says he only began breaking down barriers when he discovered the way to an Englishman's heart was to praise his pet.

The Anglican Church is not the only one that finds the tables have turned. Earlier this month, the Vatican issued guidelines instructing trainee priests from developing countries to go home "to spread the gospel". Cardinal Tomko of the Vatican's worldwide missions, complained that too many developing-world priests training in Rome were staying on and finding work in local parishes. Fearful that the path to St Peter's was becoming a back door for third-world migrants, Vatican sources let slip that between a third and a half of priests in some African countries were now living permanently abroad.

That is unlikely to deter eager young Anglicans abroad. Where once evangelicals dreamed of darkest Africa, today their targets are more likely to be the secular streets of Tunbridge Wells.

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Art

Sell pickled sheep; buy portraits

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Though ignored by the art establishment, portraiture is thriving

THIS week the winner of one of the art world's most valuable prizes was announced. Stuart Pearson Wright scooped the £25,000 ($35,000) BP Portrait prize for his "The Six Presidents of the British Academy". The picture was controversial enough. It displays a dead chicken in the middle of a table, around which sit six of Britain's most famous academicians. But what caused even more of a stir was Mr Pearson Wright's vehement attack on Sir Nicholas Serota, director of the Tate Gallery, the day after picking up his cheque.

The National Portrait Gallery

Which of the seven is liveliest?

The hallowed Sir Nicholas is at the pinnacle of the art establishment. In the past few years he has been responsible for a huge expansion in the public display of contemporary art in Britain. He presided over the opening of the new Tate Modern in London last year. But, not mincing his words, Mr Pearson Wright called for him to be sacked. He argues that Sir Nicholas and the art establishment give money only to the likes of Damien Hirst and similar, trendy installation artists. Portrait painting, or indeed any type of painting and drawing, has been entirely neglected and has suffered as a result. "Figurative painters are on the outside, shut out."

He has a point. The noisy installationists get all the attention, but portrait painting has seen a remarkable renaissance. Mr Pearson Wright, aged 25, is only one of several young portrait painters who have come to the fore in recent years. Others include James Lloyd, Paula Rego and the late Sarah Raphael. Critics acclaim this generation as being as good as the previous one of Peter Blake, Francis Bacon, David Hockney and Lucian Freud. Yet the establishment barely acknowledges today's talented portraitists. The Turner prize is a case in point. Once again, this year's shortlist for the highest-profile art prize contains not one painter, let alone a portraitist.

Demand for portraits is keeping up with the supply of talented painters. Two bodies that introduce clients to portraitists, the Royal Society of Portrait Painters and the Fine Art Commission, report record activity of ten to 20 commissions a week. The new private clients are most often male and the sitters are mostly female. Often they are celebrating a 40th birthday. Socially, they are more country than town, more quiet than flashy. They are not on the *Sunday Times* rich list, and they are not city bonus winners.

Surprisingly, clients are not put off by the fact that the modern portrait painter, in pursuit of honesty, can be just as irreverent and iconoclastic as a Damien Hirst. Mr Hirst just mangles sheep and sharks. John Major had his neck pierced by an executioner's block in John Wonnacott's painting. The composer Harrison Birtwistle has a ship sailing between his ears in the portrait by his son Adam, and the publisher Conrad Black and his wife have been rendered as a gangster and moll by India-Jane Birley. Mr Pearson Wright's academicians get off lightly, having to put up with nothing worse than a dead chicken.

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Bagehot

The deal

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Political horse-trading determined the new shape of Whitehall. That could prove ominous

THERE are two theories about how government works: cock-up or conspiracy. Bagehot prefers the former, on the grounds that politicians are too indiscreet and too impatient to conspire successfully. But Tony Blair's reshuffle of his government, tossing aside ministers and departments, looks as though it was a bit of both: a botched conspiracy. This could have serious implications for Labour's second term. If the restructuring of Whitehall was as haphazard, ill-thought-out and driven by personal feuds as it now appears, it is unlikely to work well.

The full story has yet to emerge, but these are some of its elements. The day after the election, Jack Straw was being briefed by senior officials in the Department of Environment, Transport and the Regions (DETR) about what he confidently expected to be his new job. In the middle of the briefing, he was summoned to No 10 to see the prime minister. "I'll be back in about an hour," Mr Straw cheerily told Sir Richard Mottram, the department's permanent secretary. But the astonished Mr Straw never returned, having been informed by the prime minister that he was to become foreign secretary. The department he had been told he was going to lead was instead going to be split into two; environment becoming part of the new ministry of rural affairs, leaving the rump of transport and local government behind.

Senior officials at the Ministry of Agriculture learnt that their department was to be merged with environment when they read the Downing Street press briefing on the Internet on that Friday night. Robin Cook, who had told associates that he was to continue as foreign secretary, was equally dumbfounded. At the dawn celebrations at Millbank, he had had an amiable chat with Mr Blair, with no hint that he was to be removed. Thus when he was summoned to No 10 on Friday afternoon, he believed that his confirmation as foreign secretary was a formality. Instead, to his dismay, he was told brusquely that the only job on offer was the much less prestigious post of leader of the House of Commons. It was nearly two hours before he telephoned to accept.

What explains this extraordinary sequence of events? Mr Cook is still mystified. His fate was apparently decided only on the day of the election at a meeting in Mr Blair's house in his Sedgefield constituency attended by his closest aides, Alastair Campbell, Jonathan Powell and Anji Hunter. The semi-official version, touted by Labour loyalists, is that Mr Cook was the victim of a last-minute change of policy. Mr Campbell, Labour's spinner-in-chief, is said to have intervened forcefully to argue that the new department of rural affairs had to be enlarged to take on environment if it was to shake off its dubious reputation as a trade union for farmers. Once this was agreed, Jack Straw had to be found a new job because the dismembered DETR was too small for the former home secretary.

This tale may be plausible, but it doesn't quite ring true. It leaves out, as Blairites tend to do, the considerable influence of the prime minister's neighbour and erstwhile close friend. The key to Mr Blair's second term is Europe. The last-minute decision to throw all the pieces in the air has all the signs of a hurried deal between the prime minister and his chancellor.

Splitting up joined-up government

The mistrust between Gordon Brown and Robin Cook goes back almost to their student days. Mr Brown has never forgotten how Mr Cook refused to support him when he stood for the Scottish Labour Party executive early in his career. The Scots don't forget their grudges. Nor does the chancellor like having his tail tweaked by a euro-enthusiast with a mandate to speak out on Europe. Did the chancellor tell the prime minister that the foreign secretary's sacking would help secure his support for a referendum on Europe's single currency in 18 months' time? The only surprise would be if he did not. As for Mr Blair, the sacrifice of Mr Cook is a small price to pay for the backing of his chancellor on what he regards as the defining issue of his second term.

This Blair-Brown deal may have smoothed the path to a referendum, but it has done nothing to promote “joined-up government”. The DETR’s permanent secretary, Sir Richard Mottram, has warned ministers that the dismemberment of the department will cause huge problems. The main obstacles in developing Britain’s creaking transport infrastructure are environmental. Splitting the department in two will make negotiations on sensitive issues such as new road developments more difficult and much more protracted. Regional policy is now split between no fewer than four separate departments, Transport, Rural Affairs, the Cabinet Office and Trade.

All this guarantees that the turf wars in Whitehall will become even more vicious. Mr Blair can expect a succession of ministers beating at his door complaining about their colleagues. Most ludicrous of all, Margaret Beckett, the new secretary of state for rural affairs, has responsibility for environmental policy but not for climate change. That remains the preserve of the deputy prime minister, John Prescott, allowing him to stride the international stage when he is not enforcing the prime minister’s writ at home. It is unclear how he and his new team at the Cabinet Office—Gus Macdonald and Barbara Roche—will work together. All are combustible personalities. Is this the beginning of a covert prime ministerial department? If so, who is really going to be calling the shots and how will Whitehall departments react? Stephen Byers, at transport, can hardly welcome the prospect that he will be second-guessed by a Cabinet Office stuffed full of former transport ministers.

The fate of governments is often decided early on by decisions taken in haste when politicians are desperately tired after an election. Tony Blair may have calmed his chancellor, but the smell of improvisation surrounding his new government hardly inspires confidence in its future.

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Conservative leadership

The form

Jun 21st 2001
From The Economist print edition

The Tory leadership race is under way, with three, maybe five, candidates

	Europe	Social policy	Background	Hair coverage	Parliamentary party support	Grass-roots support	Odds
Michael Portillo	Anti, but trying not to alienate the other lot	Admits to homosexual past: watchword is "inclusivity"	Spanish ancestry lends cosmopolitan gloss	Luxuriant, coiffed and distinctly European	60-odd, including half shadow cabinet	Doubtful: his main problem	4/9
Iain Duncan-Smith	Very anti; refused to join John Major's front-bench	Likely to be drawn from the letters page of the *Daily Telegraph*	Pukka: cavalry officer whose father was a Spitfire pilot	Sparse: troubling echoes of Haguism	Some on the right	Not much	10/3
David Davis	Europe minister under Major, but anti now	Son of single mother: may make him more liberal than he looks	Poor London boy turned successful businessman	A "thatch", says admiring novelist Frederick Forsyth	Maybe a handful	Who?	7/1
Kenneth Clarke	Passionately pro: cost him leadership last time round	Claims "classic liberal" views, not obvious when home secretary	Midlands working class; Cambridge; law	Deliberately dishevelled and utterly English	30-odd pro-Europeans	Europhilia counts against him	6/1
Michael Ancram	Probably pro	Patrician liberal	Earl	Receding but refined	A smattering	Good in shires	12/1

THREE candidates—Michael Portillo, Ian Duncan-Smith, David Davis—have declared themselves for the Tory leadership. Michael Ancram, party chairman, was expected to declare as *The Economist* went to press. Ken Clarke, chancellor of the exchequer under John Major, has not said whether he will stand. He is currently in Vietnam, as a director of British American Tobacco. "Trust Ken to be flogging cigarettes to the third world on the day of the Queen's Speech," said a Portillo ally.

It will be a long slog. First, the Tories' backbench 1922 committee has to elect a chairman. He has to organise the vote in the parliamentary party. The names of the winner and runner-up go through to the next round, in which the party membership (325,000, average age 62) votes. That may not happen until September.

For those interested in the main issues being discussed (what the candidates' positions are on Europe, for instance, and who has more hair than William Hague), we offer a brief assessment of form above.

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Independent Insurance

Not my fault

Jun 21st 2001
From The Economist print edition

Nobody wants to take the blame for the demise of Independent Insurance

ITS fall from grace was swift and brutal. Last December the British property and casualty insurer's stock was still one of the most popular in the industry. City analysts tipped Independent Insurance's shares and ratings agencies gave the company a thumbs-up. Six months later Independent Insurance was declared insolvent after PricewaterhouseCoopers, an auditing firm called in to do a "forensic" investigation, had worked out the alarming extent of the company's potential liabilities.

What went wrong? The buck is currently being passed between regulators, actuaries and auditors. The Financial Services Authority, which regulates Britain's insurance industry, was responsible for deciding on the required level of reserves—the difference between its assets and its technical liabilities which provides a safety net against fluctuations in claims or losses on investment—needed to keep Independent Insurance solvent. Watson Wyatt, Independent's external actuary, was responsible for keeping an eye on those reserves. And KPMG, an auditor, had signed off Independent Insurance's accounts.

At present the auditors, actuaries and regulators involved say they have done their job properly or refuse to comment. But if they really had, the insurer's demise could have hardly been so rapid. Tellingly, the Serious Fraud Office, an independent government department that investigates complex fraud, is currently looking into the case.

Independent Insurance, set up by the mercurial Michael Bright in 1987, seemed to do well when its competitors did not. After it was floated eight years ago its profits kept going up and its shares multiplied in value. But it was too good to be true: the insurance market has been "soft" these past five years, insurance jargon for not lucrative, and is only slowly starting to recover now. To do well in such an environment, an insurance firm is either exceptionally lucky, or it is taking larger risks than its peers are. Schroders Investment Management decided it must be the latter, and started to sell its stake in the company more than a year ago. GE Capital, an American financial group, got cold feet in January. It would continue to reinsure Independent Insurance (insurers also buy insurance for themselves) only if the company was to put up collateral.

Depending on what Independent put up as collateral, it may be worthless now. Yet it is some of the company's 500,000 policyholders rather than reinsurers or bankers who will be bearing most of the burden of the firm's collapse.

Individual policyholders are relatively safe: they will have almost all their claims met under the Policyholder Protection Act. But commercial policyholders, such as the London Fire Brigade and the Surrey County Cricket Club, are legally entitled only to claims made on compulsory insurance policies. There is little they can do, except sue some of those responsible for making sure that this sort of thing does not happen.

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Waterstone's

Cooking the books

Jun 21st 2001
From The Economist print edition

The idea of a restaurateur running bookshops is not as silly as it sounds

THERE has been speculation this week that Luke Johnson, the chairman of a mussels-and-chips restaurant chain called Belgo, is about to make a bid for the Waterstone's chain of bookstores. Mr Johnson is the latest in a line of suitors. HMV Media, owner of Waterstone's, has been trying to sell the bookstore business since the beginning of the year. Tim Waterstone, founder of the chain in 1982, failed to buy it back earlier this year for a cash offer of £180m. Talks with Ottakers, another chain of bookshops, also collapsed.

Synergy

Those two bidders were at least in the book trade. But Mr Johnson's interest has raised eyebrows. He is one of the country's most successful entrepreneurs, the co-founder of Pizza Express, owner of the Belgo restaurants and the Ivy. But still, a restaurateur running a book chain?

In fact, the two businesses have become increasingly alike in recent years. Bookstores, with Waterstone's in the lead, have become more like restaurants or cafes, and vice versa. Both businesses have tried to create a Parisian approach to eating and reading, where the customer can read and browse at his leisure, in comfort, in an ambience which is interchangeable between a cafe and a bookshop.

Take Waterstone's in Piccadilly, London, which claims to be Europe's largest bookshop. Spread over six floors, this behemoth of book retailing boasts a posh restaurant and a separate cafe in the basement, a juice bar by the children's books department and a swish "studio lounge" bar to fortify readers in the arts and drama departments on the top floor. The whole shop and the bars are open until 11pm.

This is the logical extension of the founding vision of Tim Waterstone. When he opened his first shop in 1982, he said his mission was to create beautiful environments to shop in. This was in stark contrast to old-fashioned bookshops such as Foyles, which made no concessions to the customer in terms of service or comfort. Apart from anything else, it was notoriously difficult ever to find a book there.

However, the competition has since caught up. Other bookstores, such as Ottakers and the American-owned Borders, have been replicating and stretching the Waterstone's formula with greater success. By comparison with the competition, one prominent London literary agent described the Waterstone's shops as "a bit dark and very tired". With others copying the Waterstone's formula, there is also a lot of overcapacity in the bookshop market, which has squeezed profits.

As a result, Waterstone's has been struggling. With all the uncertainty hanging over the business, staff morale has slipped. A successful bid would end the uncertainty. Mr Johnson would bring a familiarity with the food and drinks side of the business. The hope is that he would also modernise the group.

There is still scope for Waterstone's to go further down the Barnes and Noble road. Their New York bookstores are usually held up as the model of relaxed, accessible book-selling. Barnes and Noble has struck a successful balance between having enough books to make the customer feel he has sufficient choice, and yet not so many as to make him feel overwhelmed.

Indeed, Barnes and Noble is often referred to as the perfect partner for Waterstone's, and has been expected to make a bid for the group in the past few years. The fact that no bid has ever materialised is testimony to the difficulties of making money in the modern booktrade.

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Regional spending

The cash of the north

Jun 21st 2001 | NEWCASTLE-UPON-TYNE
From The Economist print edition

England's regions reckon they get a raw deal compared with Scotland

TONY BLAIR says that his government will deliver better public services in the next four years, and he is planning to spend a lot more money to achieve his ambition. He knows what he wants to spend the money on—education and health, principally—but that leaves open the increasingly contentious question of where the money should be spent.

Labour MPs in northern England are becoming agitated about the fact that their regions get less money than Scotland does. Peter Mandelson, Labour MP for Hartlepool, told a conference in Newcastle on June 21st that he wants the imminent White Paper on English regional government to lead to referendums on regional assemblies in 2003 and elections in 2004. As the politics of the regions hot up, so will the even trickier issue of the disparities in spending between the regions.

Government spending in Scotland, Wales and Northern Ireland is based on the Barnett formula, which says that for any per-head spending increase given to an English domestic programme, such as education, the Scots, Welsh and Northern Irish must be given the same per-head increase. These increases are added to existing spending totals. Since the Scots started out in 1978 with a 22% spending advantage over England, they have stayed ahead of English spending levels.

Labour MPs in the North-East feel their region has similar economic and social problems to Scotland and that therefore they ought to be getting the same level of public spending. The Treasury's time-honoured rule is that money should be distributed so that every citizen gets the same level of public service, but the money that goes to local councils to spend on schools and is distributed to hospitals by Whitehall is governed by complicated formulae, based somehow on needs. Even so, levels of government spending overall do not bear much relation to need (see chart). Scotland, London and Northern Ireland do particularly well, although perhaps London can claim that the cost of providing services in the capital is bound to be high, and Northern Ireland is both poor and burdened by security requirements.

The big losers on this analysis are the North-West and the North-East, which get much less public spending per head than Scotland, even though they are poorer. But restoring some sort of balance is fraught with difficulties. Though there might be a case for it, reducing Scotland's spending level would be politically suicidal for Labour, which faces a serious threat from the Scottish National Party.

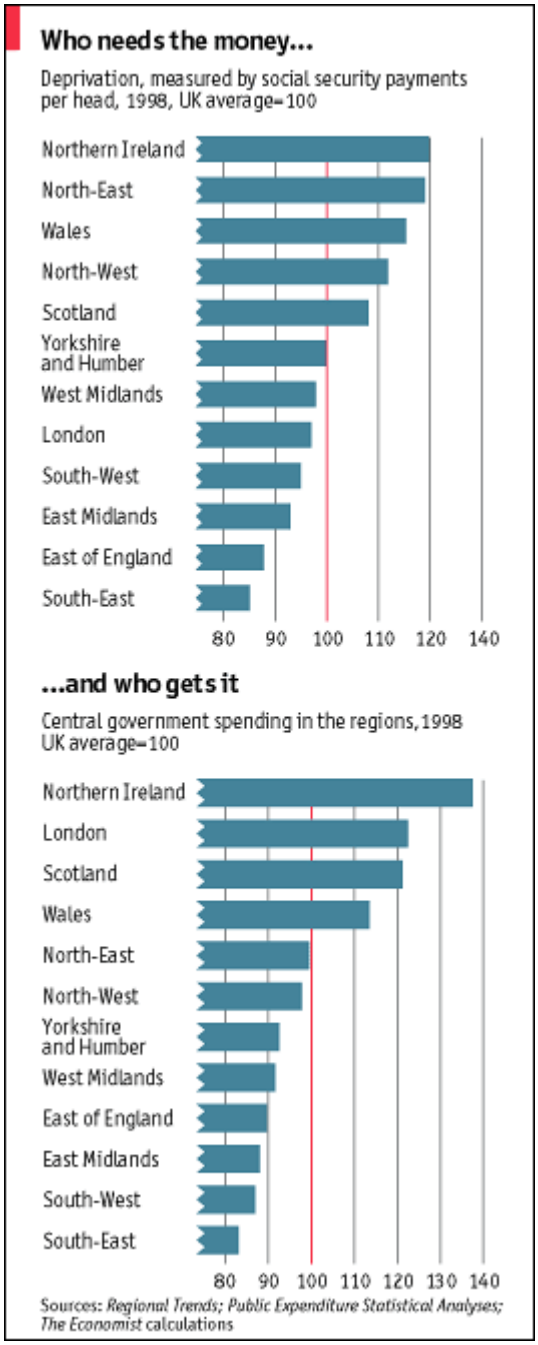
Since the Labour party has similar troubles in Wales, it looks as though the problem will have to be solved by reallocation within England. But trying to do that, Mr Prescott has openly admitted, will leave "blood on the carpet" because there will be winners and losers. Spending in the North-West and the North-East is above the English regional average, so trying to redistribute money to them will cause outrage in other regions which, apart from London, have below-average spending.

Conceding the North-East's growing demand for parity with Scotland would be expensive because every other region would demand it too. The price tag on that little exercise, according to calculations by *The Economist*, would be a whopping £30 billion. In any event, this still does not take into account regional variation of needs for public spending. So it seems likely that the government will be forced to conduct a survey to assess just exactly what regional needs are, which more and more Labour

MPs are beginning to demand. Assessing need is difficult because many of the decisions involved are subjective: are small class sizes good educational practice, or an inefficient use of teachers?

But there is a way that the government could move meantime to soothe northern restiveness. Since the North-East and the North-West are the only regions whose needs, according to social security spending, are higher than Scotland's, the government would be justified in pushing more money northwards. Raising public spending in these regions to Scottish levels would give the North-East an extra £1.4 billion, and the North-West an extra £4 billion—big sums, but not unmanageable.

In the meantime, there is a bigger and more fundamental question that the government ought to be asking: does extra public spending mean better public services and better regional economic performance? Scotland, and all that extra money it has had in the last 20 years, should provide the answer.



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Salmon farming

Sewage with your salmon, sir?

Jun 21st 2001
From The Economist print edition

Pressure is mounting to do something about salmon farms

THANKS to intensive farming techniques, salmon is now one of the cheapest foods on the market. But cheapness comes at a price. Scottish National Heritage (SNH), a state-funded conservation body, says it is worried about the farms' impact on Scottish sea lochs; and in a report published this week, Friends of the Earth Scotland claims that the amount of waste discharged from Scottish fish farms last year was equivalent to almost twice the total amount of sewage discharged by Scotland's population.

Twenty years ago, the output of Scotland's few small salmon farms was barely 800 tonnes. Last year, 340 farms—two-thirds of them owned by Norway's Norsk Hydro and the Netherlands' Marine Harvest—produced 127,000 tonnes.

Salmon are kept at higher densities than battery hens. Packed in cages of up to 70m in diameter, holding up to 500,000 fish, they are fattened on a diet of the rendered remains of small fish. Anti-bacterial chemicals are used to ward off sea lice and other parasites. Colouring agents are included in their pellet food because, deprived of its natural diet of krill and shrimp, the flesh of a farmed salmon looks an uninviting shade of grey. Roche sells a colouring agent, called Salmofan, which allows salmon farmers to choose the exact shade of pink they like for their fish.

Intensive feeding combined with heavy doses of chemicals inevitably causes environmental problems. Some of the food, together with large amounts of ammonium-rich salmon excreta, drops through the cages on to the sea bed. The startling decline in wild Scottish salmon is being blamed on pollution and interbreeding between wild and farmed salmon. Early in the 19th century, 56,000 fish were netted or trapped in one season from just three pools on the Don. These days, Scotland's total annual wild salmon catch is around twice that.

Scotland's rural affairs minister, Ross Finnie, has so far resisted calls for an inquiry made by two Scottish parliamentary committees. But SNH's support for an independent review will increase pressure on the government.

The Scottish Executive's reluctance to interfere with an industry that has brought thousands of jobs to poor rural areas is understandable. But there are less destructive ways to farm salmon. In Orkney, some organic farmers produce salmon at about half the density of conventional farms, without toxic chemicals or colourings. Their food is coloured with crushed prawn shells, part of the salmon's diet in the wild. The strong tides in those northern waters wash through the farms, reducing the problem of sea lice and other ailments. These farms' costs are 50% higher than most. But if the resulting fish is better and more edifying than the usual slimy supermarket creature, it has to be worth it.

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Rioting in Algeria

The swelling anger of Algerians

Jun 21st 2001 | TIZI OUZOU
From The Economist print edition

EPA

Algerian protest has spread beyond Kabylia. But is it being manipulated?

Get article background

THE anger that has been swirling for weeks around the Berber-speaking area of Kabylia has now spilled into other Algerian regions, with riots erupting in towns that are regarded as Arab rather than Berber. Protesters, armed with stones and metal bars, have attacked the premises of state companies, making it clear they are fed up with living under a thinly-veiled military dictatorship that has failed to resolve huge social and economic problems.

Kabylia, the mountainous region to the east of Algiers, remains the centre of the protests. Confrontations, sometimes lethal, rumble on in the small towns dotting its hills. The regional capital Tizi Ouzou has been the scene of renewed clashes in which youths fight it out with anti-riot police and the gendarmerie. One of their main demands is the withdrawal of the gendarmes, regarded as corrupt and brutal, from their region. But the young men in this careworn town with its soulless tower blocks insist that their struggle is not aimed at giving Kabylia a special status. The rest of Algeria, they say, is as tired as they are of the nepotism and patronage that have become the regime's hallmark.

The anger in Kabylia was unleashed by the killing in April of a young man being "questioned" by the gendarmerie. A crackdown left scores dead, and ensured that the region would remain defiant. Since then the authorities have been trying to stop the contagion from spreading.

But, emboldened by the example of the Kabyles, the demonstrators in Arab towns have shouted such slogans as "*Nous sommes tous des Kabyles*" to make the point that they too want jobs, housing and respect from the authorities. This solidarity is the reverse of what Algeria's military rulers have been hoping for, and state television has anxiously portrayed the protests in Kabylia as a strictly regional affair.

At first it said that the Kabyle people were motivated by their long-standing demand for official status for the Berber language. But then it opted for an approach that many fear will deepen the divisions in a society already ill at ease with itself. Describing the Kabyle protesters as wreckers and looters, television provided extensive footage of the fights and destruction of property that occurred during a march by Kabyle demonstrators on Algiers on June 14th. An official praised the youth of the capital for "defending their honour" against the rioters' acts of sabotage.

The huge protest in Algiers had drawn hundreds of thousands of Kabyles to the capital. Despite a ban by the interior minister, the organisers insisted on trying to present a list of demands at the presidential

palace. The protest turned violent when the marchers attempted to breach a police cordon blocking access to the palace. The police pushed them back behind the line with water-cannon and tear-gas.

For the Kabyles, the Algiers march has left a bitter aftertaste. It was an embarrassing shambles in which they failed to deliver their demands. They are now accusing the authorities of having planted infiltrators to sow mayhem and provoke fights with local residents. These accusations are supported by the Socialist Forces Front (FFS), a Kabyle-based opposition party that has consistently refused compromise with the military authorities.

The FFS has been trying to turn the anger of the Kabyles into pressure for democratic concessions from the military-backed regime. But, despite the party's attempts to forge a national base, it still suffers from being too narrowly identified with the Kabyles. The oldest opposition party in the country, it was set up by a Kabyle hero of the liberation war, Hocine Ait Ahmed, who fell out with his revolutionary colleagues over issues of democracy soon after independence in 1962.

Although demonstrators may now be taking their example from Tizi Ouzou, the Kabyles are still seen as somewhat different. There is mistrust, fanned at first by French colonial policy and later by successive authoritarian governments which portrayed demands for recognition of the Berber language as attempts to dismember Algeria's hard-won statehood.

Yet the Kabyles are perhaps the best known of all Algerians. Poor soil and overcrowding have led many of them to seek work in France. The French colonisers, playing divide and rule, concentrated their educational efforts on the Kabyle mountains. The outcome is that the Kabyles are strong in both the administrative elite and the emigré community, ensuring that even if their demands are not met, their voice is heard at home and abroad.

Algeria's military-backed regime, *le pouvoir*, which includes some Kabyle generals, appears determined to sit out the current protests, saying as little as possible. The FFS continues to accuse the authorities of having fomented and deliberately prolonged the unrest. It is difficult to prove such allegations, but it is also hard to dismiss them: in a country controlled by the intelligence services, manipulation is a staple of political life.

Some speculate that the aim is to undermine the president, Abdelaziz Bouteflika, who is locked in a power struggle with the generals who brought him to office. Others say the purpose is to deflect attention from the pressures that the fractious military regime is coming under as the Islamist threat fades, and its human-rights record and domestic failures catch up with it. On the other hand, it could be a genuine outburst of frustrated anger.

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Iran's parliament

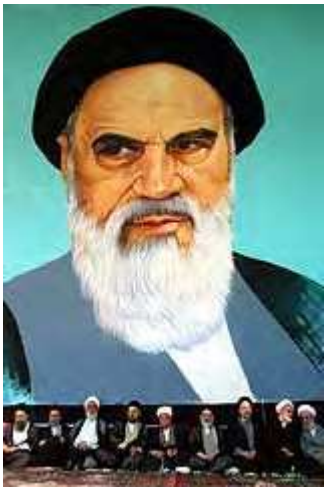
Reform, but only as largesse

Jun 21st 2001 | TEHRAN
From The Economist print edition

To get anything through parliament needs the supreme leader's blessing

WAS it an early sign that Ayatollah Ali Khamenei, Iran's supreme leader, was taking note of the recent clear victory of Muhammad Khatami, the reformist president? On June 17th members of Iran's parliament tried to launch an investigation into the state broadcasting monopoly, answerable to Mr Khamenei, which beams out anti-reformist propaganda. But the speaker, Mehdi Karrubi, cited a parliamentary bylaw that seemed to render the inquiry illegal. Members were angry, and Mr Karrubi referred the matter to Mr Khamenei himself. The result was a surprise: on June 18th the supreme leader announced that, far from infringing his privileges, parliamentary investigations would "protect the health" of the institutions he controls. He also issued a thinly-veiled order to scrap the offending bylaw.

EPA



Still under Khomeini's eye

This seems a big change since Mr Khamenei wrote his last letter to parliament a year ago, spiking a bill designed to protect reformist newspapers from being closed. His current enthusiasm for "religious democracy" seems calculated to alienate hardline conservatives, who argue that religious government gets legitimacy from God, not the voters.

Some of Mr Khatami's supporters hope the supreme leader's latest intervention will pave the way for investigations into other secretive institutions, including the judiciary. More radical deputies resent the fact that, 12 years after the death of Ruhollah Khomeini, the Islamic republic's founder, reform still depends less on legislation than on the largesse of the unelected conservative establishment. Ever since Mr Khatami's allies were swept to power in last year's election, efforts to pass reformist laws have been blocked by the Council of Guardians, all of whose members are appointed, half by the supreme leader.

Whatever clues the episode offers about Mr Khamenei's leanings, the truth is that reform still cannot take place without the acquiescence of top conservatives. Securing this acquiescence is where Mr Karrubi, for all the resentment aroused by his genuflection to the supreme leader, may prove invaluable. Both the speaker and the small parliamentary group he leads differ from most other reformists in being clerics, with good links to the establishment.

But they are lukewarm about cultural liberalisation and freedom of expression, and uneasy with the free-market slogans that have come to dominate reformist debate on the economy. Such differences increase the possibility of a split in the reformist movement. For the moment, caution is holding sway, but only just.

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Rwanda's militiamen

Coming home to fight

Jun 21st 2001 | RUHENGERI
From The Economist print edition

After fighting in Congo, Rwanda's militiamen threaten their own regime

"THE United Nations may as well go home, it's Rwanda that is doing the disarming once again." The Rwandan military commander, standing at the scene of the latest assault by the *Interahamwe*—the militia responsible for Rwanda's 1994 genocide—in north-west Rwanda, spoke with satisfaction. And, indeed, he was surrounded by evidence of disarmament, of a kind: the bodies of militiamen yet to be buried, and a motley collection of prisoners.

One of the prisoners, a small, skinny boy named Claude in oversized wellington boots, was being put through his paces by a captured sergeant. He said he had received two or three months' training in Masisi, across the border in Congo, by members of the old Rwandan army (FAR), which was defeated after the genocide. In the past month, more than 1,500 such youths, plus two or three of their commanders, have been killed or captured in or around the foothills of the Virunga volcanoes. They say that their military chiefs told them to come back to Rwanda to overthrow President Paul Kagame.

Fear of the disarmament clauses in the Congolese peace accord seems to have triggered the militia's latest attacks on Rwanda. But the current Rwandan army scoffs at the idea that the UN monitors in Congo, known by their French acronym MONUC, could disarm anyone, much less men who have nothing to lose. "The forces have shown us they are not interested in voluntary disarmament," says a Rwandan presidential adviser, mildly.

Until now, Rwanda's civil authorities had at least pretended to think MONUC could play a role. But the pretence is slipping. If the militiamen are pushed out of Congo, their disarmament will take place on the battlefields of Ruhengeri, says the adviser, referring to the province that encompasses much of the Virunga foothills.

So far, the attacking militiamen have been mainly poorly armed youths, many recruited from the camps. But more experienced fighters are behind them. Rwandan intelligence sources confirm that a brigade of the *Interahamwe* called Horizon has been making its way northwards from south-east Congo into South Kivu. Horizon's commander-in-chief is Protais Mpiranya, who was chief of Rwanda's presidential guard under the late Juvenal Habyarimana; all the other commanders, from brigade to platoon level, are ex-members of the old Rwandan army.

Rwanda's government says it would like the *Interahamwe* to lay down their arms and come home. Boys such as Claude would be ready to do so. But the commanders, who are genocide suspects, would be much harder to convince.

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Syria and Lebanon

Goodbye to Beirut

Jun 21st 2001
From The Economist print edition

AP

Syria begins to acknowledge that it has outlived its welcome

IN THE ten years since Lebanon's civil war sputtered out, furious gentrification has airbrushed away most of the pockmarked, shell-shredded façades that had made Beirut a monument to human folly. With the hushed departure of 6,000 Syrian troops this week, the city shed one more reminder of its 1975-90 trauma.

However, the troops are more out of sight than out of mind. Syria's redeployment leaves 25,000 of its soldiers in Lebanon, their camps and checkpoints keeping a physical grip on the east and north of the country. More insidiously, the sisterly Arab republic also retains its tentacles in Lebanon's politics, economy and internal security apparatus.

The Syrians' presence in the capital had, in any event, become more of an eyesore than a nuisance. The dishevelled soldiers, slumped around primus stoves in abandoned buildings plastered with tattered icons of the Assad clan, clashed with Beirut's hip self-image as much as they offended nationalist sensibilities. They will not be missed, yet their withdrawal has been greeted with little of the jubilation expressed a year ago, when Israeli troops slunk out of southern Lebanon.

The Syrians were officially invited guests when, in 1976, they moved in to forestall a victory by an alliance of Muslims and Palestinians over Christians. They stayed on to deliver the closing blow of the war, scuppering an ill-planned uprising by Christians opposed to the 1989 Taif accord, the shaky pact among Lebanon's factions that has kept the peace ever since. The accord stated that the Syrians should withdraw to the mountain watershed that divides coastal Lebanon from the Beqaa valley, and they have now, rather belatedly, done so, with the exception of a few scattered outposts.

Syria claims that the redeployment simply fulfilled its treaty obligation. The pullback was, however, a sign that the Syrians recognise their growing vulnerability in Lebanon. As the Lebanese see it, Syria, with its feeble economy and antiquated armed services, has no better tool than Lebanon with which to remind Israel that it wants the return of the Golan Heights, occupied since 1967.

The Syrians have used Hizbullah, the Lebanese resistance group, to prod Israeli memories, and the Israelis have not shied away from reminding the Lebanese that they are getting a raw deal. But Lebanon's muted response, indeed crocodile tears, when in April Israel bombed Syria's main radar station in Lebanon may have signalled to the Syrians that their battered hosts are sick and tired of the game.

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Congo and its neighbours

Peace here means war elsewhere

Jun 21st 2001
From The Economist print edition

What happens to the foreign armies as Congo moves towards peace?

Get article background

AN EASING of the war in Congo may lead to a fiercer war in some of Congo's nine neighbours. The most likely victims—Rwanda, Burundi and Angola—are already bracing themselves for an upsurge in fighting. Tanzania, Uganda, the Central African Republic and Congo-Brazzaville could also be affected, at least by a new influx of refugees, and possibly by a spillover from the fighting.

There are over 100,000 armed foreigners in Congo, of whom about 58,000 are members of rebel groups from neighbouring countries. Some support the government, others the Congolese rebels, others again are there for their own reasons. Under the 1999 Lusaka agreement, now being cautiously implemented, the foreign armies must withdraw. The accord laid down that a UN force should disarm the foreign rebels, but the force that is there has no Security Council mandate for this—and nobody who does not wish to give up his gun is doing so.

Congo is full of semi-literate young men (and some women) who live by killing and looting, and do not care much whom or where they fight. For them peace in Congo will simply mean that they go in search of trouble elsewhere. But other fighters are committed members of foreign rebel groups, who moved to Congo to use its unpoliced spaces to launch hit-and-run raids into their own countries.

In the 1990s Congo became a proxy battleground for civil wars in Angola, Rwanda and Burundi. The governments of these countries sent their armies into Congo partly to pursue their own rebels. Once inside the country, both armies and rebels found mines, hardwood forests, coffee plantations and much else that they could exploit. None of the foreign armies or rebel groups will be poorer when they leave Congo than when they came in.

If the 2,000 or so well-armed UNITA rebels from Angola were made to leave Congo, they would cross back into northern Angola and intensify the fighting there. Rwandan rebels have already started to launch attacks into their own country (see article).

In Burundi, a UN-sponsored peace process has failed to bring together the Tutsi-led military government and the militant Hutu groups. A boatload of Burundian rebels was ambushed on June 13th on Lake Tanganyika as they tried to make their way home from Congo. Burundi's ambassador to the UN, Marc Nteturuye, explained what was happening. "The welcome peace prospects in Congo are paradoxically, but deliberately, at the root of the worsening security situation in Burundi," he said. "Peace will have either to be regional or not be there at all."

The war in Congo has created strange bedfellows. The bond between Rwanda's and Burundi's Hutu rebels is long-established, as is the co-operation of the Rwandan and Burundian armies in tracking them down. But a new informal alliance has developed between the Ugandan and Rwandan armies and Angola's UNITA rebels, though the only thing they have in common is that they are all against the Angolan army. That alliance will probably end if peace can be found in Congo. But if a peaceful Congo proves unsafe for Rwandan and Burundian rebels, they, in turn, could decide that richer pickings are to be had fighting beside the rebels in Angola.

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Jordan and its Palestinians

All quiet on the eastern front

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From The Economist print edition

King Abdullah's troubles in keeping things jogging along

IT IS bad enough living next to Saddam Hussein, Ariel Sharon and Yasser Arafat. But rowdy neighbours are not the only bother facing Abdullah, the 39-year-old monarch who has run this tidy little country since the death of his father, Hussein, two years ago. He must also juggle with a sagging economy, a divided population and the contradictory demands of powerful friends in the West.

The king has done well so far, simply by sustaining an air of normality amid these pressures, but his troubles are beginning to converge. At home, elections loom after this week's royal decree dissolving parliament. The polls will pit a weakened pro-government side against Islamist groups that have gained from the general unrest.

The challengers recently scored another point. In 1999 the government summarily deported four leaders of Hamas, the Islamist Palestinian group, even though they were all Jordanian citizens. The most senior of them, Ibrahim Ghoshah, has now shown up at Amman airport asking to be let in. Since many Jordanians think of Hamas as a heroic resistance army, the incident is embarrassing.

Not single spies

The sorrows come, one upon another. The Security Council's plan to impose smarter—read, tighter—sanctions on Iraq threatens a decade-old deal that gives Jordan both $750m a year of cheap Iraqi oil and a vital boost to its feeble exports. The continuing *intifada* is driving away investment even as unemployment pushes 25%. It is also straining Jordan's 1994 peace treaty with Israel, and stirring anguish among the 3m, out of 5m Jordanians, who are of Palestinian descent.

Jordan's Palestinians have more local grievances, too. Ever since Black September, the 1970 uprising in which Palestinian guerrillas nearly toppled the Hashemite monarchy, the government has favoured native East Bankers with jobs, contracts and other largesse. It also favours their votes. Gerrymandering has ensured that, despite their numbers, Palestinians have fewer seats in Jordan's parliament than their cousins, the "Israeli Arabs", have in the Knesset. More urbane than the largely rural East Bankers, Jordan's Palestinians own most of the country's businesses, which means that they are subject to taxation without much representation.

The government's edginess became clear last week when it abruptly slapped controls on the border crossing from the West Bank. The move was explained as a precaution against any Israeli thought of expelling the Palestinians. But to Palestinians the new controls looked more like a tightening of the siege on the occupied territories. Whatever the truth, the new rules are doing damage.

At least they are safe, and free

Yet even in the refugee camps that fringe Amman, resentment with the government, and fury with Israel, mingle with relief at being safe. Since the outbreak of the *intifada*, solidarity protests have drawn a dwindling number of heavily policed protesters. Jordan's Palestinians prefer to help out in other ways, sending money to relations, paying for scholarships for the children of *intifada* martyrs, and treating the wounded in Jordanian hospitals. Like most Jordanians, their more pressing concerns are jobs and careers. "Fix the economy, and they just might forget the *intifada*," insists a prominent economist.

The government can take credit for trying to do this. It has declined to appoint an ambassador to Tel Aviv, but keeps alive the practical relationship that employs 13,000 Jordanians in joint-ventures. The

country's accounts are slowly improving. Foreign debt per person has fallen by half in recent years, to under $1,000. The legal underpinnings to attract more investment are being laid, including the establishment of an ambitious special economic zone on the Gulf of Aqaba. And although complaints abound of obtuse bureaucracy and heavy-handed police, Jordanians are better off on these scores than every one of their Arab neighbours.

None of this, however, can compensate for the lack of regional oxygen that has choked economic growth for three successive years. Stagnation, coupled with resentment at the meagre returns from peace with Israel, and anger at America for bashing Iraq, is fuel to the Islamists' fire. They boycotted the last election in 1997, which helped secure the government the tame parliament it wanted. Yet one experienced politician reckons that even the departing legislature, if asked again to ratify peace with Israel, would have voted it down.

The reason given for dissolving parliament was that King Abdullah judged it incapable of drafting a fairer electoral law in time for the election due in November. The tacit admission that the current law was flawed will win him some friends. He will win more by promptly issuing a better one, as he is constitutionally entitled to do. But Jordan's constitution is a funny thing. It says that a new election should be held within four months, yet it also allows the king to rule by decree, and to postpone elections for up to two years in emergencies. That option may look tempting.

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OPINION

Invention is the easy bit

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Beware of new ideas. They can be 25 years ahead of their time

IDEAS are ten a penny. Put a handful of bright engineers in a brainstorming session and they will come up with literally scores of clever ideas for new products or processes. Invention is the easy bit. Innovation, by contrast, is the genuinely difficult part. And what makes a successful innovation usually has little to do with the originality of the idea behind it. What it does depend on—and crucially so—is the single-mindedness with which the business plan is executed, as countless obstacles on the road to commercialisation are surmounted, by-passed or hammered flat. Life in the fast lane really is 1% inspiration and 99% pure sweat.

Implicit in all this is timing. The window of opportunity has to be ajar—or, at least, show signs of opening. It matters little whether some exciting new technology has suddenly become available. If the market timing is wrong, the innovation will most assuredly flounder.

Cold comfort

Take cryogenics—the industry based on operating at temperatures below –100°C. This is the realm of industrial gases such as oxygen and helium, as well as vacuum engineering, rocket fuel, and loss-free transmission of electricity. Most would agree that the cryogenics industry, as it is known today, started in 1895 when Carl von Linde, an engineering professor from the Technische Hochschule in Munich, established the world's first large-scale plant for manufacturing liquid air.

Others had liquefied industrial gases before. A Frenchman called Louis-Paul Cailletet produced small quantities of liquid air in 1877. Sir James Dewar, the inventor of the vacuum flask, had even built a machine for producing liquid oxygen in 1891. But none of these methods could be scaled up as efficiently as von Linde's process. The interesting thing was that, no sooner had von Linde gone into business, all manner of air-liquefaction plants suddenly sprang up.

But why did they not do so sooner? All the know-how for producing liquid air on a large scale—the inventions, discoveries and scientific theory—had existed for decades. In 1853, James Prescott Joule and William Thomson (later Lord Kelvin) had laid down the theoretical basis of gas liquefaction, which has underpinned the cryogenics industry ever since. The one missing ingredient was added in 1869, when Thomas Andrews showed that every gas had a critical temperature, above which it could not be liquefied. So, why did it take a quarter of a century for the first successful applications to appear?

The conventional answer is that the enabling technology was simply not good enough. There is some truth in that. But a better answer is that, while the need for liquid air existed, the demand had yet to materialise. Since the time of Sir Humphry Davy in the early 1800s, the medical profession had expressed a need for liquid air. Though not ideal, it was seen as a handy substitute for an oxygen supply. Unfortunately, no one was prepared to pay for it—and thus the need was not a demand. Only when the arms race gathered pace in the late 1800s did the steel industries of Europe start demanding tonnage quantities of oxygen for removing carbon and other impurities from their steel. Then, and only then, did gas liquefaction take off.

Fast forward to the 1970s when the Internet was being strung together. At the time, all the discoveries, theory and know-how existed for wiring it up in a peer-to-peer (P2P) fashion—ie, without a hierarchy of central servers to oversee its operation. Attempts were even made to do so, before settling for a more conventional client-server type of architecture. Today, with P2P finally being taken seriously, it seems that, once again, it has taken a quarter of a century to bring a promising technology to fruition.

Like the early days of air liquefaction, the enabling technology for P2P networking was nowhere near

robust enough in the 1970s to do the job. The individual computers in the network could barely keep up with their own work loads, let alone have processing power to spare for other tasks. And the communications links between them were painfully slow. But it is questionable whether, in the geeky environment of the early Internet, the demand was really there. In a pair of articles (see "Computing power on tap" and "Profit from peer to peer"), the question is posed whether, over the past quarter of a century, the need for P2P and its big brother, the Grid, has finally become a demand with ready buyers queuing for it. Lots of start-up companies are betting it has. So, too, are numerous government agencies. One thing is for sure, however: whether it succeeds this time or not, P2P is one of those rare ideas that is simply too good to go away.

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LAST WORD

Godfather of the Pill

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It is 50 years since Carl Djerassi invented the contraceptive pill—and changed human behaviour for good. He has not stood still since, scientifically or socially. His latest work—a play called "Oxygen", which opened recently in San Diego— examines the nature of achievement and accolades

NEITHER philanderer nor dilettante, Carl Djerassi likes to describe himself as an "intellectual polygamist"—a man who treats his interests as seriously as his wives. He should know. He has had five careers: industrial chemist, university professor, corporate grandee, author and, most recently, playwright. Along the way, he has had three wives and various other incarnations, from patron of the arts to sportsman.

Although Dr Djerassi hung up his lab coat nearly a decade ago to follow his literary ambitions, he will be remembered for his research rather than his writing. Above all, he will go down in history for one particular scientific achievement: the synthesis of norethindrone—in short, "the Pill". More than any other pharmaceutical product introduced since the second world war, the oral contraceptive has been celebrated (and denigrated) for spawning a cultural revolution. Today, more than 80m women around the world use oral contraceptives.

Fifty years ago this October, Dr Djerassi and his colleagues at Syntex, a small Mexican drug company, produced the world's first synthetic version of progesterone—a steroid hormone pumped out by the body to maintain pregnancy—which could be taken by mouth, rather than by injection. Mexico was, and still is, an unlikely birthplace for pharmaceutical advances. But it had one natural advantage: various species of inedible yams called Dioscorea.

In the 1940s, Russell Marker, a renegade American chemist, went to Mexico in search of a ready source of diosgenin, a soapy steroid, to transform into progesterone. Existing methods for synthesising progesterone were complex and hugely expensive. Using yams as a starting material, Dr Marker developed a faster, cheaper method of producing the hormone from diosgenin. In the process, he helped to establish Syntex, along with two immigrant entrepreneurs.

Although Dr Marker soon parted company with Syntex, the firm recruited two steroid chemists transplanted by the war: George Rosencranz, a Hungarian, and Dr Djerassi, then a 26-year-old Bulgarian who had emigrated to America via Austria. In the 1940s, chemistry excited the sort of enthusiasm that genomics does today as a gateway to a world of valuable new drugs. First, Syntex's chemists found a way of turning diosgenin into cortisone, the post-war wonder drug for arthritis. This gave the company a foothold in the lucrative steroid market. But it also provided Dr Djerassi and his colleagues with a springboard to their next project: the chemical re-engineering of the Mexican yam component, diosgenin, to produce 19-norethindrone.

The genealogy of the oral contraceptive is a complicated one, as Dr Djerassi points out in his new book, "This Man's Pill: Reflections on the 50th Birthday of the Pill" (to be published by Oxford University Press later this year). While the men at Syntex were its metaphorical mothers, they did not see norethindrone as a contraceptive agent. Instead, they hoped that it would be a more convenient formulation of progesterone, which was already used to treat menstrual disorders and infertility.

It was Gregory Pincus, an endocrinologist in Massachusetts who was working on ways to inhibit ovulation, who first demonstrated that norethindrone (along with a similar compound from Searle, an American drug company) could do the trick. Without the release of an egg from its home in an ovary, there can be no union with sperm—and therefore no conception. For this act of "intellectual fertilisation", Dr Djerassi gives Dr Pincus paternity of the Pill.

The Pill was born in the 1950s, an era of technological optimism, but it came of age in the 1960s when "chemophobia", as Dr Djerassi terms it, was creeping into western society, spurred on by such debacles as thalidomide poisoning. In America, politicians started asking hard questions about the risks of oral contraceptives, and drug regulators began to demand decade-long toxicology tests and large clinical trials to demonstrate the Pill's safety. All this has added to the cost of developing contraceptives. It has also taken up valuable years of patent protection when improved versions of the drug might have been on the market, making money to fund research into better versions still.

An even greater problem has been product liability. Unlike most drugs, contraceptives are given to healthy people who are less likely to tolerate nasty side-effects than those who are already sick. Pharmaceutical firms selling the Pill, such as Searle, were hit with a barrage of lawsuits in the 1960s and 1970s, as women blamed the drug for their health problems. Thousands of scientific studies since then have dispelled many of these fears. There are some health risks associated with the Pill in particular groups of users, but the drug has also been shown to protect women against some forms of cancer—as well as often-overlooked, but equally deadly, complications of pregnancy or abortion.

Still, concerns about the safety of the Pill remain, as was shown in 1995 when panic broke out in Britain over the possible risk of blood clots caused by new, low-dose contraceptives. Such scares do little to persuade the drug companies that contraception is a good business to be in. While vaccine developers, who face similar liability risks, have been lured back by the provision of no-fault insurance in America, no such protection has been extended to contraceptive makers. No wonder drug firms have been deserting contraception in droves. In 1969, there were 13 companies active in contraceptive research; today, only one of the ten largest firms is doing anything serious.

None of this bodes well for the development of more effective or more convenient forms of birth control, such as a contraceptive vaccine, or a Pill for men. As Dr Djerassi sees it, the biochemical and pharmaceutical industries are far more interested in producing blockbuster drugs for the world's affluent "geriatric" societies, whose ageing populations will pay the earth to relieve their ailments, than in making contraceptives for the poorer, "paediatric" countries of Africa, Latin America and Asia.

None of this bodes well for the development of more effective or more convenient forms of birth control

A similar commercial bind is responsible for the paucity of new drugs for nasty tropical diseases that afflict mainly poor populations. But Dr Djerassi feels strongly that the world needs a wider variety of "hardware"—drugs and other devices that impede conception—to match a bewildering array of "software"—social, economic and cultural conditions—in different societies which influences their birth-control needs. For the moment, there are serious compatibility problems between the two.

Although the past 40 years of thinking on reproduction, at any rate in the rich world, has been dominated by a desire to separate sex from fertilisation, Dr Djerassi reckons that the next 40 years will be driven by a desire to separate fertilisation from sex. He believes that the techniques of test-tube conception developed to help the infertile will become the preserve of the fecund instead.

Fertile imagination

In Dr Djerassi's future world, men and women will have their sperm and eggs frozen in their 20s and then undergo sterilisation, free to pursue their professional and sexual interests content in the knowledge that their cells can be safely resurrected and reliably made to unite in a test-tube whenever they want a child. As a bonus, existing techniques, such as pre-implantation diagnosis, will allow couples to select embryos free of a growing number of diseases whose genetic basis is known, and which could be detected through laboratory testing prior to being implanted in a cosy womb.

As far as Dr Djerassi is concerned, it is largely cost and a lingering romanticism about old-fashioned conception that prevents more fertile couples from adopting this approach today. But there are many who argue that techniques that are made technically possible by the inventiveness of reproductive scientists, such as cloning, are not always socially desirable.

Dr Djerassi is all for reproductive technology which enhances personal choice, and ensures that children are genuinely wanted. Although some would question his rosy outlook, he at least acknowledges that this new frontier of fertility will require broader social debate and more intelligent regulation—particularly in what he calls America's "wild west" of reproductive biology, where such work is done mostly in private clinics.

For the past 15 years, Dr Djerassi has tried to engage the public in such issues with “science-in-fiction”, in which he tries to make tricky technical concepts, and the “tribal” culture of modern scientists, more accessible to laymen by presenting them as imagined stories and personal dramas. His five novels so far have tackled such thorny topics as scientific fraud and male impotence. Since 1998, he has extended his range to “science-in-theatre”. His first play, “Immaculate Misconception”, was a fictional account of the development of intracytoplasmic sperm injection, a test-tube technique developed a decade ago to help men with few or feeble sperm to conceive. His latest play, “Oxygen”, written with help from Roald Hoffmann, a Nobel prize-winning chemist, explores the Byzantine world of this ultimate scientific accolade. The play had its debut in San Diego in April and will open in London this autumn.

Dr Djerassi credits the Pill with pushing him beyond the hard edges of chemistry to consider the softer (ie, social and ethical) dimensions of new technology. It has changed his life in other ways, too. A quick glance around his apartment, perched on San Francisco’s Russian Hill, with its vistas of the city and bay outside and dazzling array of art within, shows that the Pill has worked wonders for Dr Djerassi. His shares in Syntex, which prospered in the 1960s and 1970s, bankrolled a personal gallery which once included at least eight Picassos, half a dozen Giacomettis and three Degas. Apart from an impressive collection of work by Paul Klee, which Dr Djerassi still treasures, much of the rest was sold to found an artists’ colony to commemorate his daughter, Pamela, whose artistic career was cut short by suicide.

Through fame and fortune, the Pill has brought Dr Djerassi a large and varied list of acquaintances. It is not every steroid chemist who has Timothy Leary knocking on his door looking for LSD; who can call on John Adams, the composer of “Nixon in China”, to write his wedding music; or who shares a grandchild with the late Robert Maxwell, a British newspaper tycoon. The lives of scientists are generally more predictable than those of their discoveries. Dr Djerassi has been lucky enough to live up to the Pill.

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MONITOR

The smaller the better

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Investors have suddenly started taking nanotechnology seriously. Will too much money, too quickly, spoil things?

TIME was when nanotechnology was equated to intergalactic space travel—science fiction for the cinema, with little relevance for the real world. How things change. Last May, Ottilia Saxl of the Institute of Nanotechnology, a non-profit organisation based in Stirling, Scotland, gathered more than 100 venture capitalists, investment analysts, industrial bigwigs and start-up hopefuls to a meeting on investing in nanotechnology, held at the Royal Society in London. After the dotcom bust and the fibre-optics glut, nanotechnology has suddenly become the refuge of choice for technologically obsessed investors. But why "nano"—and what is it, anyway?

"Fantastic Voyage" showed the way

The sci-fi version of swarms of "nanorobots" repairing cells in the bloodstream is as far off as ever. A more practical definition concedes that anything precisely fabricated with dimensions of less than 100 nanometres (a nanometre is a millionth of a millimetre) fits the bill. This includes everything from particles for skin cream to next-generation transistors. By this definition, nanotechnology is already a multi-billion dollar business.

Unfortunately, such a definition sprawls over too wide a swathe of industries to be useful. A more practical distinction, at least when it comes to investment, is between the sort of nanotechnology that is plotted on industrial roadmaps, such as the semiconductor industry's detailed plans for the next decade of microelectronics miniaturisation; and the kind that pops up unannounced in more conservative, slower-moving industries. The latter is less predictable, but often more spectacular when it finally breaks through.

Matthias Werner, a technology analyst at Deutsche Bank, illustrates this second type of nanotechnology breakthrough graphically with videos of a surgical scalpel based on a nanostructured diamond. This slices much more neatly into eyeballs to remove a cataract than standard tools because its edges are less jagged. The technology is now being commercialised by Gesellschaft für Diamantprodukte (GFD), a company based in Ulm, Germany.

Another useful distinction that James Chilcott of Evolution Capital, a venture-capital firm based in London, points to is the difference between "one-shot wonders" on the one hand, and firms that have a strategy for developing successive generations of products based on proprietary technology on the other.

A good example of the second type is Nanomat of Dublin, Ireland, which is developing a series of products based on nanoparticles made of metal oxides. Thin films of such nanoparticles could be used to make digital displays with the look and feel of paper. A product based on this technology is expected to be on the market within a couple of years.

Donald Fitzmaurice, a professor of nanomaterials at University College Dublin, and the founder of Nanomat, believes that thin films made of metal-oxide nanoparticles could have a promising future in solar cells and batteries. They could also be used to help diagnose diseases in people. Nanomat is aware that clinical trials could delay the commercialisation of medical applications for years. However, having a pipeline of potential nanotech innovations coming steadily on stream in different sectors, at different times, is what attracts investors.

Evolution Capital is not the only firm scrutinising the emerging nanotechnologies for possible winners. At least half a dozen other venture-capital firms have launched nanotech funds in the past six months.

Chevron Technology Ventures, the investment arm of the American oil and gas group, launched a $100m fund in April to invest in start-up firms—with nanotechnology as one of its main themes. There is even a website (www.nanoinvestornews.com) to keep investors up to date on nanotechnology opportunities.

What can investors expect? Ramon Compaño, a technology co-ordinator at the European Commission in Brussels, points to the scanning-probe microscope—a device that produces images of nanometre-sized objects. A decade ago, a number of companies set out to commercialise such microscopes. Several of these have since either merged or been snapped up by larger firms. However, that has not stopped new entrants from continuing to join the fray, with novel twists on the basic scanning-probe design. This picture of a technological ecosystem in which mature firms are gobbled up while new ones appear has a lot in common with the history of biotechnology. No “new economy” is needed to explain this kind of industrial evolution, believes Mr Compaño.

Shell-shocked venture capitalists fleeing the dotcom pounding seem to be finding the world of the super-small an attractive shelter—at least for the time being. The danger is that the investment firms’ expectations could run too far ahead of nanotechnology’s ability to deliver. Whether investors have the patience to hang around for the pay-off is the big question.

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MONITOR

Speed reading

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A new gene-sequencing technique could decode a person's genome in hours instead of years

FOR all the infinite variety of life on the planet, DNA is fairly uniform stuff. Humans share nearly all of their DNA with one another, and a goodly chunk with worms and mice. Even subtler are the variances between the nucleotides that make up DNA. This quartet of molecules—adenine, cytosine, guanine and thymine—are nearly identical, differing chemically by only a few atoms.

When the two complementary strands of a DNA molecule bond together, however, adenine unerringly picks out thymine, and guanine always bonds with cytosine. Thus far, scientists have relied on this phenomenon to work out the sequences of human genes by using fluoresent molecules that mimic natural nuceotides to pair up with existing strands.

Performing this procedure, though, requires many copies of the unknown strand. Making these copies takes time. That is why sequencing the human genome took a government consortium more than a decade and Celera, a biotechnology company in Rockville, Maryland, nine months—though, to be fair, Celera's effort was helped along by being able to use information gleaned from the public project.

Now, using an entirely new approach, some scientists say that they may be able to pull off the same feat in a matter of hours. Daniel Branton and Jene Golovchenko of Harvard University, along with a former colleague, David Deamer of the University of California, Santa Cruz, want to build a detector that will read the sequence of bases in a single strand of DNA as it squeezes through a tiny hole. By measuring slight fluctuations of electrical current at this "nanopore", the researchers hope to be able to discern what bases are shuttling through it.

Dr Branton and Dr Dreamer drew the concept for the detector from the operation of an ordinary cell membrane. This is made up of a double layer of fat molecules that is impermeable to charged particles. Protein channels studded in the membrane allow the cell to exchange select molecules through this barrier.

The team of researchers followed suit. They divided a dish into two with a lipid bi-layer, and placed a long, single strand of nucleotides (which, in nature, carries a negative charge) into one half of the dish. The researchers then employed an old foe, a bacterium called *Staphylococcus aureus*, to make a single channel, or nanopore, in the membrane. The microbe produces a protein that kills cells by puncturing their membranes. Though toxic to humans, the *S. aureus* protein was thus ideally suited for piercing a minute hole in the fat barrier.

With a flip of a switch, the researchers created a voltage bias across the artificial membrane, causing the negatively- charged nucleotide chain to push its way through the pore towards the positive side of the dish. As each nucleotide flows through the nanopore, it generates a distinct current. The researchers hope that eventually these electrical signatures can be read off, one by one, in real time—as if the bases were flashing identity cards as they passed through a turnstile.

Several technical challenges must be overcome before individual bases can be discerned this way. At present, the chain of nucleotides moves too quickly—at one base every millionth of a second—to be examined closely. Dr Branton guesses that the process would have to be slowed to a thousandth of its present speed—one base every millisecond—for the chain to be moving slow enough for the electronic equipment to keep up.

The researchers are also looking for synthetic alternatives to the *S. aureus* protein. They fear that a protein nanopore may prove too fragile for large-scale use. They must also work out a way to unravel the double helix of a DNA molecule and feed only one of its two strands through the channel.

And finally, they need to get access to extremely sensitive electrical detectors and computer algorithms that can cope with the avalanche of data that will result from scanning up to 70,000 nucleotides in a matter of minutes.

In these travails, the researchers will be helped by Agilent Technologies of Palo Alto, California, a spin-off from Hewlett-Packard that specialises in making sophisticated detectors for biotechnology and chemistry laboratories. In May, Agilent and Harvard signed an agreement that provides licensing rights for the technology to Agilent. The company also entered into a research collaboration with the Harvard team to develop the technology further. The concept could take up to a decade to bring to fruition. But the prize—anyone's genome, on demand, within hours—seems well worth the wait.

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MONITOR

Spotting the potholes

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Digital cameras on board a networked vehicle are helping engineers to repair America's crumbling roads

THERE are about 4m miles of public roads in America, but not all of them are fit to drive on. Some 16% of the country's rural roads and 32% of its urban roads recently surveyed were graded as either "poor" or "mediocre". The problems worsen in the winter, when water collects beneath cracks in the road surface, freezes and then melts, leaving a hole in the ground and no support for the road above. The resulting pothole can significantly damage a car driving over it: under-inflated tyres collapse, wheels bend, suspension and alignment can be skewed.

Pothole detector on the prowl

Almost as difficult as driving over a pothole is repairing one. Usually, state and federal transport agencies can track potholes only by laboriously video-taping road surfaces and analysing the tapes. Moreover, only one person can examine the video footage at a time, and videos have to be transported between different offices. Add the headaches of keeping massive tape libraries, and it seems almost miraculous that highways are ever repaired at all.

Kelvin Wang, a civil engineering professor at the University of Arkansas (a state whose highways are ranked among the worst in America), has designed a special van, equipped with digital cameras, to collect more accurate road-surface data. The high-definition images are sent direct to the engineers' computers, allowing them to identify and evaluate road damage. The resulting data can then be accessed by anybody in the network. Recently, his team added an automatic system to detect and classify cracks in the road. Up to now, data on such cracks have been lacking. The new technology should help engineers prevent potholes from developing.

Dr Wang's digital van has already been borrowed by the United States Army Corps of Engineers to survey three air-force bases, and federal and state transport agencies have made inquiries about the crack classification system. One obstacle to a switch to digital is price: the prototype van cost $500,000 to produce, though subsequent versions for highway authorities are expected to cost half that. In the meantime, Dr Wang and his associates have also developed a multimedia-based highway information system (MMHIS) that is now in use by the Arkansas State Highway and Transportation Department. The MMHIS uses video compression and a high-speed network to link existing video footage to engineering data, allowing users easier access and a simpler way of sharing their findings. It is not perfect—digital images are more detailed than the current analogue footage—but it allows for greater flexibility and speed in analysing data, and thus better co-ordination of road repairs.

Dr Wang believes that digital vans will be a common sight on American highways within a few years. Until then, with the number of cars steadily increasing, potholes will prove a costly problem. The state of Michigan already allows drivers to file for damages caused by potholes, and a judge recently ruled that Wisconsin could be held liable for potholes in its roads. The odds are that most states would rather pay for Dr Wang's technology than for a barrage of lawsuits.

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MONITOR

Put on a coat

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Shrink-wrapped cells dodge the immune system

IN PATIENTS with diabetes, the transplanting of so-called "Islet" cells—those that malfunction in cases of diabetes—has the potential to make a sick person well. Unfortunately, because the transplanted cells come from pigs or other humans, they are immediately recognised as foreign by the recipient's immune system, and promptly destroyed. Coating the cells before they are transplanted could stop the immune system from rejecting them. But the coat must be able to protect without interfering, because the Islet cells also have to be able to do their job. They need access to the bloodstream to measure the level of glucose and regulate the release of insulin.

Coatings made of certain polymers do not trigger the immune system. In principle, they can be made thin enough to allow nutrients such as glucose to move into the cell, and insulin to move out. But most methods for coating particles apply a "one-size-fits-all" coating to objects of widely varying dimensions—Islet cells, for instance, range in size from one to three times the width of a human hair.

At the University of Chicago, groups headed by Sidney Nagel and Milan Mrksich have applied a process called "selective withdrawal" to shrink-wrap particles such as corn pollen, which are similar in size to Islet cells. They use a plastic tube to suck oil from the top of a container of oil floating on water that, in turn, has the coating chemicals dissolved in it. Sucking fast drags a thin spout of water up through the oil from below. Any particles in the water get drawn up the spout and remain coated by a layer of water. The oil keeps the spout in the centre of the tube and prevents it from falling apart prematurely.

Because the spout narrows as it rises, each particle siphoned up with the water forms a bulge—rather like an orange in a Christmas stocking—that induces the spout to break, producing separately coated particles (see photo above). Large particles break the spout earlier and small particles later, ensuring uniform coating size—no matter how big or small the particle. As the particles continue up the tube, they can, depending on the chemicals in the water, be treated by heat or light or further chemical modification to harden the coat. They are then separated from the oil and collected.

The leap from pollen grains to Islet cells is not, of course, a trivial one. The next steps include finding polymer coatings that can both protect living cells and allow them to function, and then optimising the process so that tens of thousands of cells can be coated rapidly all at once.

New coating technologies also hold promise for other applications, besides coating living cells. Building on work started in the 1960s, Mehmet Toner and his colleagues at the Massachusetts General Hospital in Boston have been painting silicon wafers with animal liver cells to learn how cells communicate.

Dr Toner's group uses a variety of microfabrication techniques borrowed from the semiconductor industry to pattern and coat wafers so that functional liver cells (hepatocytes) and supporting cells will stick to them in the right number and configuration for them to interact. Properly constructed, the cells can perform critical liver functions, such as making clotting factors and albumin (needed for fluid balance), or removing ammonia from blood.

The ultimate goal is to build a device to help patients with acute-stage liver failure, or who are waiting for a liver transplant. An effective device will require only 10% of the mass of an ordinary liver. Even so, that means packing some 20 billion cells together. By stacking the wafers and interspersing them with fluid layers, the researchers aim to create a system that behaves like a space-efficient artificial liver.

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MONITOR

Powered paper

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Batteries printed on paper promise a whole new set of marketing tools

BECAUSE it is versatile and cheap, paper has held its ground against the onslaught of electronic displays. But with a few more features, paper might not only defend its territory better, but even mount a counter-attack. All that is required is an economical means to make paper go electronic.

A four-year-old company called Power Paper, based in Kibutz Einat, Israel, has taken a step in that direction. The firm has invented a battery no thicker than a sticking plaster that can be printed on to paper or packages using the conventional silkscreen process. Layers of zinc and magnesium dioxide, acting as a cathode and an anode, produce an electric current strong enough to run microelectronic devices. Each square-inch of Power Paper cell provides 1.5 volts and can last on the shelf for up to two years. Better still, because the cell is not cased in metal like an ordinary battery, it is light and flexible, as well as being easier to dispose of.

International Paper, based in Purchase, New York, intends to offer Power Paper's batteries in packaging this year. A wrapper equipped with such a power supply could play audio clips from a compact disc it contains, or it could display moving images on a flexible screen. But each singing CD could cost an extra 20 cents to $1 to package. International Paper hopes that companies will treat this extra expense as money well spent—as a way of swaying consumers on the verge of making a purchase. By the autumn, Power Paper's batteries could be in games and other novelty products.

The company is also experimenting with more practical technologies to make use of this battery source. Each year, International Paper ships millions of packages containing fresh fish, fowl or produce. Such packages have to be air-conditioned at all times. At present, a recorder attached to a pallet of half a dozen boxes takes a reading of the boxes' temperature every hour at a cost of $30-40.

By linking a Power Paper battery to an equally thin temperature sensor, International Paper can now track the temperature of an individual box continuously, for less than $1 per tag. This enables a supplier to know exactly when a package's contents were spoiled, and thus who to blame. Although more trials of the technology are required, International Paper hopes to make such sensors available by October.

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MONITOR

The sound of shuffling

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How to reproduce the ambiance of a live concert in the home

WHAT is it about open-air concerts that many find so appealing? It cannot be the acoustics, which are virtually non-existent. So it has to be the hubbub, the spontaneity of the performers, even the mosquitoes—in short, the total experience. But if the crowds, insects and threat of rain do not appeal, consider downloading live concerts from the Internet instead. With a new recording technology under development at AT&T, all it will take to recreate a live concert in the living room is a five-speaker home theatre system.

Taking outside sound indoors

By fashioning a micro-array of seven microphones—five arranged radially plus one pointing up and another pointing down—James Johnston and his colleagues at AT&T Laboratories in Florham Park, New Jersey, have developed a recording system that can recreate the acoustics of a concert just about anywhere—whether in Carnegie Hall or in Central Park.

Previous attempts at “sound re-creation” have been nowhere near as successful. One of the bravest was a British innovation in the 1970s called “Ambisonics”. This took advantage of the audible cues, known as “head-related transfer functions”, that people use to determine distance and direction. By injecting false cues into different channels of a sound system comprising between two and four speakers, the listener was tricked into imagining that the sound was travelling around the immediate surroundings. In demonstrations, bees were heard zooming around listeners’ heads.

Ambisonics tried to capture some of the audible cues that people use to determine distance and direction by using a multi-directional, multi-channel microphone located at one point. Other, newer methods use the shape of the human head, or head-related transfer functions, to trick the listener by placing false cues into two channels. But in order to experience the full effect, a person must sit on the centreline between the two loudspeakers and not move or turn the head. Unfortunately, one of the ways that listeners check out a space audibly is by making small, unconscious head movements, which head-related transfer functions cannot imitate.

The AT&T recording system does things differently. Instead of creating an artificial head-related transfer function, it uses the biological one that already exists in and around the human head. The arrangement of the seven microphones captures the most audible sounds from the right directions and with the correct acoustical time delay. The result is a recording that replaces the acoustics of the living room with the acoustics of the place where the recording was made—in effect, immersing the listener in the event without pinning him down to one spot. Technicians set up the micro-array in the same way they might set up a normal microphone. Then, by mixing the seven recorded channels down to five, they create a recording that can be played on any five-speaker home theatre system.

But do not expect the technology to take over the compact disc (CD) market—at least, not yet. CDs are still recorded in stereo using only two channels. Five-channel sound requires a digital video disc (DVD) or, better still, an audio-DVD. Also, rock music and jazz are usually mixed layer-by-layer in the studio, making it hard to re-create the equivalent of “seating-related” sound on a disc.

It is live productions—especially symphonies and sporting events—that will work best with the new AT&T recording system. Capturing their spontaneous noise and unique acoustical environment helps to re-create the perception of the original soundfield for the listener at home. One of the ideas that AT&T is pushing is tele-subscriptions to symphonies. Imagine having the same acoustics and surround-sound of Carnegie Hall, the Met, La Scala, Covent Garden all in your own living room.

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MONITOR

Extreme measures

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Thanks to lithography using extreme ultraviolet light, chip makers can remain abreast of Moore's Law for a few more years

THERE have been false warnings aplenty, but this time it looks real—or, at least, more real than at any time before. The fact is that silicon chips, as the world knows them, are reaching their limits. The present form of optical-projection lithography, which uses light to print circuit patterns on slivers of silicon, will soon hit the buffers. The wavelength of the light it uses means it is unable to print lines narrower than 0.1 micron (ie, one tenth of a millionth of a metre). Small as it may sound, that will still be too wide to fit the number of circuits on a chip that the semiconductor industry needs to keep up, as it has done for decades, with Moore's Law.

This empirical, but remarkably prescient, observation by Gordon Moore, one of the founders of Intel, states that the number of transistors that can fit on a computer chip—and thus its capacity to crunch numbers—doubles every 18 months. The importance of keeping up with Moore's law cannot be overstated. It is not just a measure of the chip makers' technological prowess, but the commercial heartbeat of the semiconductor industry itself.

What to do? One option is to stop using silicon. Intel has examined the possibility of replacing silicon oxide transistor gates with thinner ones made of oxides of aluminium, titanium or tantalum. IBM has tried making transistors from carbon nanotubes (hollow cylinders of carbon atoms). But even a silicon-nanotube hybrid could be five years away.

Therefore the leading chip manufacturers have concentrated on changing the printing process instead of the material. Several alternatives to optical-projection lithography have been examined—X-rays and lasers being two—but the front-runner is extreme ultraviolet (EUV) lithography. The smaller wavelengths of ultraviolet light allow it to be more closely focused, with the ability to print circuits as thin as 0.03 microns. That would allow the industry to build 10-gigahertz microprocessors by 2005 compared with today's 1.5-gigahertz devices—and thus keep abreast of Moore's Law.

Unfortunately, EUV lithography has its complications. The ultraviolet light is easily absorbed in gases, so the process needs to be carried out in a near vacuum. Also, the light has to bounce off a series of photoreflective masks acting as mirrors no less than nine times before it hits the actual chip. Any inaccuracy in the reflections loses light, slowing down the chip-making process. Furthermore, the chip must be kept dust-free. Placing a dust-capturing reticle on top of the chip, as is the current practice, would interfere with the reflecting images.

To solve these problems, the Department of Energy in Washington, DC, and three national laboratories in California teamed up with a consortium of American chip makers, including Intel, AMD and Motorola, to form the Extreme UltraViolet partnership in 1997, with IBM joining their ranks earlier this year. Intel announced the creation of the photoreflective masks in March, and the partnership has now unveiled its first prototype machine for making chips with EUV lithography.

Still, chip makers are keeping their options open. IBM is co-developing a process using electron-beam lithography with Nikon, a Japanese optical equipment maker. That process, which uses electrons instead of light to etch the chip, should start producing semiconductors in early 2003—about the time that the EUV equipment will begin being tested by users. It seems that Moore's law is safe—at least, until the next false alarm.

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MONITOR

Marching on its stomach

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Fed with sugar cubes, gastrobots— robots with stomachs—make their own energy on the go, allowing them to wander freely

WHAT a piece of work a robot is—at least, indoors. Outdoors, away from its electricity socket, a robot has to carry a hefty portable power supply all the time. That is a problem: batteries need to be recharged; solar panels do not work in the shade and are usually too wide to be practical. Only if it could power itself would a robot in the field work as efficiently as one in the factory.

Chew-Chew pulls in for a meal

To solve the problem, Stuart Wilkinson, a professor of mechanical engineering at the University of South Florida, has adopted a microbial fuel cell (MFC). This takes energy from sugar-eating bacteria and converts it into electricity. With an MFC, a robot could power itself by breaking down vegetation. Dr Wilkinson recently created a one-metre-long robot, nicknamed "Chew-Chew" for its train-like appearance and its ability to power itself by "eating" sugar cubes. He has even coined a new word for such a class of robot: "gastrobot", literally a robot with a stomach.

Chew-Chew's "stomach" contains water, *Escherichia coli* bacteria and special chemicals to break down the sugar cubes. The sugar is then fed to an on-board MFC. Three sugar cubes, fed over 18 hours, will make Chew-Chew move for five minutes. "It's pretty pathetic, as robots go," Dr Wilkinson cheerfully admits. But it is the first robot ever to be powered by food alone.

Chew-Chew could not survive in the wild. It cannot actually chew, but swallows sugar cubes whole. A robot using vegetation as a fuel source would need to break down its food before it reached the stomach. Sugar cubes produce little waste beyond carbon dioxide and water, but a foraging robot would need a defecation system. Rather than eating only when it is hungry, the gastrobot would have to provide the MFC with a constant food intake to keep it running at peak efficiency. And the bacteria in the MFC eventually produce an acidic build-up—the robot equivalent of heartburn.

Dr Wilkinson and his project team have received a grant from Intel to work on the next step: a robot that can digest orange juice and dispose of the accompanying liquid waste. Such a robot might eventually prove a boon to Florida's agricultural industry. It could roam one of the state's orange groves, gathering soil data and extracting juice from fallen oranges. It will take some ingenuity to create a gastrobot that works as well as the human—although that design, too, needed some time to reach its present level of efficiency.

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TEAM SPIRIT

Of high priests and pragmatists

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Continuing our series on managing innovation, we look at ways of getting disparate groups to work together more effectively. One group developing environment- friendly solvents found that adding a social scientist to the team speeded up innovation

NECESSITY may be the mother of invention, but it is also a more distant relative of collaboration. Getting researchers from different fields to work together sounds sensible and easy enough. In practice, however, it is often hampered by the same sorts of language and culture barriers that make the European Union such a challenging ideal. When pushing new technologies through the R&D pipeline, such barriers have to be overcome fast—or potential products may die on the laboratory bench.

Faced with this challenge, an American research centre based at Chapel Hill, North Carolina, which goes by the unwieldy name of the Science and Technology Centre for Environmentally Responsible Solvents and Processes, has chosen an unconventional solution. The centre has included a social scientist in each of its research teams. The idea is to analyse communication patterns between the participants and to suggest improvements to make them more effective. Early results are promising.

The centre's aim is to replace environmentally hazardous chemical solvents with liquid carbon dioxide in a range of manufacturing applications. Carbon dioxide is a gas at atmospheric pressure. But when squeezed to more than five times normal atmospheric pressure, it becomes a liquid. Joe DeSimone, head of the Chapel Hill centre (see photo), and his erstwhile students first put liquid carbon dioxide to work in dry-cleaning, by developing detergents that could be dissolved in the liquid. Since liquid carbon dioxide has a very low surface tension, it easily seeps into the pores of a fabric, taking the detergent with it.

The standard dry-cleaning solvent, perchloroethylene, is a groundwater contaminant and probable human carcinogen. Petrol, another established solvent, is highly inflammable. By comparison, carbon dioxide—the gas that makes soft drinks bubble—is harmless. Dr DeSimone and his colleagues founded a company called Micell Technologies in 1995 to exploit the idea. The company's dry-cleaning franchise, Hangers Cleaners, which opened its first store in 1999, now has more than 50 outlets in America that use Micell's patented carbon-dioxide cleaning process.

The Chapel Hill centre has been perfecting a number of other uses for the technology. The centre has scientists and engineers from the University of North Carolina at Chapel Hill, North Carolina State University, North Carolina A&T University, and the University of Texas at Austin. A consortium of big chemical companies is also backing its work.

Cleaning chips

The researchers are organised in teams according to the applications they are pursuing. For example, Ruben Carbonell, based at North Carolina State University, is helping to lead a team looking at the use of liquid carbon dioxide in the microelectronics industry. To reproduce microelectronic circuit patterns on a silicon wafer, the wafer is coated with a thin film of an ultraviolet-sensitive polymer known as photoresist. This is normally done using organic solvents such as glycol ethers, which are noxious pollutants.

By developing polymers that dissolve in liquid carbon dioxide, the researchers are able not only to solve an environmental problem but also to coat the wafers with much thinner films. This is because the very low surface tension and low viscosity of carbon dioxide allow it to spread more easily on a spinning wafer.

This is important for the next generation of microchip plants, where ultraviolet light of much shorter wavelength will be used to reproduce finer circuit features. Such light will not penetrate thicker films of photoresist, so thin films are needed to ensure proper exposure.

So much for the theory. Getting the process to work in practice requires a range of skills and techniques. This is where Diane Sonnenwald, a social scientist from the University of North Carolina, has made a mark on the project. As the research team, with participants from the various universities, got going, Dr Sonnenwald mapped out the pattern and level of communication between researchers, and conducted interviews to find out which colleague a given researcher thought it would be most fruitful to collaborate with.

Dr Carbonell acknowledges that the effort taught him to appreciate rather more the abilities of others in the team. For example, researchers at the University of Texas were experts at measuring surface tension, while others in the project were more knowledgeable about viscosity. The complementary skills turned out to be vital to get a complete picture of how the liquid carbon dioxide spreads over the silicon wafer.

In another spin-off from the social study, Carol Hall, a theoretician, was encouraged to collaborate with Vinayak Kabadi, who was doing experiments on the interface between liquid and gaseous carbon dioxide. Getting to grips with this is crucial to an understanding of how the solvent evaporates after the polymer has been spread on the surface—and thus for controlling the thickness of the film.

The traditional gap between theorists and experimentalists is often caricatured as one of haughty high priests versus pugnacious pragmatists. But the reality is more often that one researcher does not understand another's jargon, or is afraid to ask stupid questions, or is hesitant about giving up vital and hard-won information to a distant colleague. These were the kinds of barriers that Dr Sonnenwald was able to dismantle, leading to greater co-operation between theorists and experimentalists.

It is too early to say how much this approach has actually accelerated development of liquid carbon-dioxide technology. But funding bodies are nodding approvingly. It seems that, like sports teams that hire a psychologist to produce a winning mindset, future technology teams could have a social scientist on board to help them take the shortest route from laboratory to marketplace.

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REPORT: COMPUTER NETWORKS

Computing power on tap

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In the first of two articles, we look at the most ambitious attempt yet to combine millions of computers seamlessly around the world—to make processing power available on demand anywhere, rather like electrical power. The second article examines how firms could benefit from installing mini-grids of their own

IMAGINE that every time you plugged in a toaster, you had to decide which power station should supply the electricity. Worse still, you could select only from those power stations that were built by the company that made the toaster. If the power station chosen happened to be running at full capacity, no toast. Replace the toaster with a personal computer and electrical power with processing power, and this gives a measure of the frustration facing those who dream of distributing large computing problems to dozens, hundreds or even millions of computers via the Internet.

A growing band of computer engineers and scientists want to take the toaster analogy to its logical conclusion with a proposal they call the Grid. Although much of it is still theoretical, the Grid is, in effect, a set of software tools which, when combined with clever hardware, would let users tap processing power off the Internet as easily as electrical power can be drawn from the electricity grid. Many scientific problems that require truly massive amounts of computation—designing drugs from their protein blueprints, forecasting local weather patterns months ahead, simulating the airflow around an aircraft—could benefit hugely from the Grid. And as the Grid bandwagon gathers speed, the commercial pay-off could be handsome.

The processor in your PC is running idle most of the time, waiting for you to send an e-mail or launch a spreadsheet or word-processing program. So why not put it to good, and perhaps even profitable, use by allowing your peers to tap into its unused power? In many ways, peer-to-peer (P2P) computing—as the pooling of computer resources has been dubbed—represents an embryonic stage of the Grid concept, and gives a good idea as to what a fully fledged Grid might be capable of.

Anything@home

The peer-to-peer trend took off with the search for little green men. SETI@home is a screen-saver program that painstakingly sifts through signals recorded by the giant Arecibo radio telescope in Puerto Rico, in a search for extraterrestrial intelligence (hence the acronym SETI). So far, ET has not called. But that has not stopped 3m people from downloading the screen-saver. The program periodically prompts its host to retrieve a new chunk of data from the Internet, and sends the latest processed results back to SETI's organisers. The initiative has already clocked up the equivalent of more than 600,000 years of PC processing time.

The best thing about SETI@home is that it has inspired others. Folding@home is a protein-folding

simulation for sifting potential drugs from the wealth of data revealed by the recent decoding of the human genome. Xpulsar@home sifts astronomical data for pulsars. Evolutionary@home is tackling problems in population dynamics. While the co-operation is commendable, this approach to distributed computing is not without problems. First, a lot of work goes into making sure that each "@home" program can run on different types of computers and operating systems. Second, the researchers involved have to rely on the donation of PC time by thousands of individuals, which requires a huge public-relations effort. Third, the system has to deal with huge differences in the rate at which chunks of data are processed—not to mention the many chunks which, for one reason or another, never return.

One solution is to pay somebody to solve these problems. In 1997 a company called Entropia was set up in San Diego, California, to broker the processing power of idle computers. Within two years, the company had 30,000 volunteer computers and a total processing speed of one teraflop (trillion floating-point operations) per second—comparable with many a supercomputer. Entropia is using this power for a range of applications, such as its "FightAidsAtHome" project, which evaluates research that could lead to potential AIDS drugs. Parabon, another processing broker, has a "Compute-Against-Cancer" project, which analyses patients' responses to chemotherapy. For processing-power brokers, aiming at the medical business is a wise move. Bioinformatics tools and services are expected to grow into a multibillion-dollar market over the next five years.

For processing-power brokers, aiming at the medical business is a wise move

But overnight fortunes are not going to be made from broking processing power. Ian Foster, a Grid expert at Argonne National Laboratory, near Chicago, cautions that "the business models that underlie this new industry are still being debugged." United Devices, a company in Austin, Texas, which was started by David Anderson (who is the brains behind SETI@home), plans to offer incentives such as frequent-flier miles and sweepstakes to encourage membership of its commercial peer-to-peer projects. One broking service, Popular Power, has already disappeared and others are going the same way.

One challenge facing commercial P2P brokers, which will haunt commercial applications of the Grid as well, is philanthropy. In April, Intel launched a philanthropic peer-to-peer program that lets PC owners give their excess processor time to a good cause. The first software package that can be downloaded under this program, developed by United Devices in collaboration with a consortium of cancer research centres, is aimed at optimising the molecular structure of possible drugs for fighting leukaemia. While this may be good promotion for United Devices, it remains to be seen how many of these brokerage firms can turn a profit.

Safety in numbers

If the P2P data-processing paradigm is the equivalent of assembling a ragtag army of poorly trained conscripts, the other end of the computing spectrum is a commando unit made up of a tightly knit set of PCs dedicated to solving a single problem. One of the pioneering efforts in this field was called Beowulf, after the hero of the legendary poem who slays two man-eating monsters. The original Beowulf, built in 1994 by Thomas Sterling and Don Becker at the United Space Research Association in Maryland, was a cluster of 16 off-the-shelf processors lined together by Ethernet cables. Its success inspired many others to build quick-and-dirty number crunchers out of cheap components—thus slaying the twin monsters of supercomputing, time and money.

Beowulf's success depended not so much on the architecture of the computer—many commercial supercomputers are based on large arrays of fairly standard processors—but more on the price/performance ratio of the network technology. Supercomputers require proprietary "glue" to link their processors together, and this is both expensive and time-consuming to develop. Beowulf-like systems tend to use fast but affordable Ethernet technology. Some of Beowulf's offspring, referred to as "commodity clusters", now rank among the top 50 of the world's fastest supercomputers—offering speeds up to 30 teraflops per second. They can often cost less than a hundredth of the price of an equivalent supercomputer. Cluster construction, which started as a nerdy hobby, is now a mature industry with turnkey solutions offered by manufacturers such as Compaq and Dell.

The intellectual link between Beowulf and the Grid is that, as transmission speeds on the Internet increase, clusters no longer need to be in the same room, the same building, or even the same country. In some sense, this is old news. A software system called Condor, devised by Miron Livny and colleagues at the University of Wisconsin in Madison during the 1980s, combined the computing power of workstations in university departments. With a Condor system, researchers can access the equivalent of

a cluster of several hundred computers.

In a similar way, a number of European supercomputer facilities were linked together in the late 1990s as part of a project called Unicore that was run by a German research consortium. Using Unicore software, users can submit huge number-crunching problems without having to worry about what operating software, storage systems or administrative policies will be used on the machines that do the work.

Between them, SETI@home, Beowulf, Condor and Unicore all contain elements of what the Grid's visionaries are after: massive processing resources linked together by clever software, so that, from a user's perspective, the whole network melds into one giant computer. To emphasise this, the latest extension of the Unicore project has been dubbed E-Grid. To purists, however, this is only the beginning. They believe that Grid technology should blur the distinction between armies of individual P2P computers, dedicated commodity clusters, and loose supercomputer networks. Ultimately, a PC user linked to the Grid should not need to know anything about how or where the data are being processed—just as a person using a toaster does not need to know whether the electricity is coming from a wind farm, a hydroelectric dam or a nuclear power plant.

Ultimately, a PC user linked to the Grid should not need to know anything about how or where the data are being processed

The missing link

Piecemeal solutions to building such a Grid are already at hand. A layer of software, called "middleware", is used to describe the kind of tools needed to extract processing power from different computers on the Internet without any fuss. The most popular middleware so far is the Globus tool-kit developed by Mr Foster's group at Argonne, in collaboration with Carl Kesselman's team at the University of Southern California in Los Angeles.

The tool-kit contains programs such as GRAM (Globus Resource Allocation Manager), which figures out how to convert a request for resources into commands that local computers can understand. Another tool is called GSI (Grid Security Infrastructure) which provides authentication of the user, and works out that person's access rights. One of the attractions of the Globus toolkit is that such tools can be introduced one at a time, and often painlessly, into existing software programs to make them increasingly "Grid-enabled". Also, like the World Wide Web and the Linux operating system, the creators of the Globus toolkit are making the software available under an "open-source" licensing agreement. This allows others to use the software freely, and add any improvements they make to it. One example is Condor-G, an improved version of the Condor program that deals with the security and resource-management problems that occur when Condor is extended over institutional boundaries.

Daily use of the Globus tool-kit has proved it to be a robust standard. But it is not the only one. Another so-called "world virtual computer" project, which aims to deliver high performance parallel processing, has been under development at the University of Virginia since 1993 and has many of the Globus features already built in to it.

Yet another is the Milan (Metacomputing in Large Asynchronous Networks) project. The goal of this joint effort between researchers at New York University and Arizona State University is to create virtual machines out of a non-dedicated, unpredictable network of standard computers. The latest stage of this project, called Computing Communities, aims to make the underlying middleware adjust automatically to the device that is being used to gain access to the Grid, be it desktop computer or mobile phone.

As well as competition from other academic projects, Globus faces the prospect of being overtaken by commercial solutions. For instance, the programming language Java, which allows a software developer to write a program (more or less) once and then run it on Windows, Linux, Macintosh or any flavour of the Unix operating system, already does many of the things that the Grid hopes to accomplish. Java has yet to be made to run on different types of supercomputer, and there are various security and local-policy issues that the language is not equipped to handle. But this could change.

Another example is Microsoft's DCOM software, which offers many Grid-like features, although there is talk of abandoning it. However, given enough support, one or other of these options could be transformed into a de facto standard. Already, Microsoft is integrating some of the Globus technology into the next generation of its Windows operating system.

Still, Globus and its various alternatives face big hurdles on the way to becoming a true Grid. To avoid computing bottlenecks, developers will have to figure out ways to compensate for any failure that occurs on the Grid during a calculation—be it a transmission error or a PC crash.

Once the commercial potential of the Grid begins to dawn, standard-setting skirmishes will break out.

Yet aother headache is latency—the delays that build up as data are transmitted over the Internet. The speed of light sets a limit to how fast electronic (or, indeed, optical) signals can travel. It takes about two-tenths of a second for light to travel halfway around the earth in an optical fibre, an aeon for an impatient processor. Smart software is needed to ensure just-in-time data delivery. Otherwise, the range of problems that the Grid will be able to deal with will be confined to the so-called "embarrassingly parallel".

Such computations are carried out on different machines that do not need to wait for results from one another to proceed. This is much simpler to organise than the typical types of parallel processing run on commodity clusters, where the calculations have to move in lockstep, sharing information at regular intervals. It is even more primitive when compared with such advanced supercomputers as IBM's Blue Gene, in which constant communication between processors is the core concept.

Challenging as this technical issue may be, more mundane problems could be a greater nuisance. Much to the chagrin of Grid purists, the system will probably have to include means for conducting virtual brokerage of computer power. This is going to be needed for accounting purposes, especially when commercial applications are involved. At the first Global Grid Forum in Amsterdam last March, Bob Aiken, a manager at Cisco Systems in San Jose, California, warned that the biggest challenges to the successful deployment of the Grid will be social and political rather than technical. Several academics have already tried to devise solutions to this problem—by incorporating some of the business tricks adopted by the peer-to-peer companies. But until there are large applications running on the Grid, such proposals remain literally academic.

Debugged by science

As with the Internet, scientific computing will be the first to benefit from the Grid—and the first to have to deal with the Grid's teething problems. For instance, GriPhyN is a Grid being developed by a consortium of American laboratories for physics projects. One such study aims to analyse the enormous amounts of data logged during digital surveys of the whole sky using large telescopes. The Earth System Grid is part of another American academic initiative. In this case, the object is to make huge climate simulations spanning hundreds of years, and then analyse the massive banks of data that result. Other initiatives include an Earthquake Engineering Simulation Grid, a Particle Physics Data Grid, and an Information Power Grid Project supported by NASA for massive engineering calculations.

Perhaps the most urgent example where a Grid solution is needed is at CERN, the European high-energy physics laboratory near Geneva. It is here, beneath the green fields straddling the French border, that the next generation Large Hadron Collider (LHC) will produce data at unheard-of rates when it starts running in 2005. The particle collisions in the LHC's underground ring will spew out petabytes (billions of megabytes) of data per second—enough to fill all the hard-drives in the world within days.

Careful filtering will slow this prodigious rate down to a few petabytes a year. Even so, this is still too much for CERN to deal with on site. The data will therefore be disseminated through a four-tiered system of computer centres, allowing them to be spread over thousands of individual workstations in dozens of universities around the world.

Here, the Grid will come into its element. Repeatedly searching and retrieving large data sets from thousands of computers would be extremely inefficient. So researchers at CERN are looking at ways of processing the data where it is—allowing a physicist sitting at any participating workstation to talk to the rest of the complex web of computers and data storage systems as if they were in his own laboratory.

This raises a radical new concept of "virtual data". The idea is that new data, derived from the analysis of

raw data, should not be discarded after use but saved for retrieval, in the same way that raw data are stored. In a later calculation, the Grid's software could then automatically detect whether a computation had to be started from scratch, or could take a short cut using a previous result stored somewhere in the system.

The European response to all the Grid activity in America is the DataGrid project co-ordinated by CERN. Here, the objective is to develop middleware for research projects in the biological sciences, earth observation and high-energy physics. As befits a project overseen by bureaucrats in Brussels, the search for an overarching Grid standard for many different science projects has become a *leitmotif*. Fabrizio Gagliardi, the project manager for DataGrid, despairs at the many Grid initiatives already underway. "If we each develop similar solutions," he says, "it simply won't work."

A plethora of Grid standards is a real possibility. After all, even electricity has no worldwide standard of voltage or frequency. Much of the talk at the first Global Grid Forum was about giving Grid development a sense of common cause. But once the commercial potential of the Grid begins to dawn, standard-setting skirmishes will break out between companies and even countries.

While scientists gear up to use the Grid, the question remains whether—beyond the search for such exotica as Higgs bosons, running vast protein-folding calculations or simulating the weather—there is any real need for such massive computing. Cynics reckon that the Grid is merely an excuse by computer scientists to milk the political system for more research grants so they can write yet more lines of useless code. There is some truth in this. Many of the Grid projects running today resemble solutions in search of problems. And given the number of independent Grid initiatives, much of the work under way is going to be redundant in any case. But there is always the hope that the competition will breed a better class of Grid in the end.

A more serious criticism is that today's Grid projects focus too much on storing and analysing large data sets, and making the sort of "embarrassingly parallel" calculations that only scientists need. These are obvious applications of the Grid. The real challenge is to figure out how to achieve the more ambitious goals that Grid enthusiasts have set themselves. Some of these are outlined by Mr Foster and colleagues in a paper that will appear shortly in the *International Journal of Supercomputer Applications*. The authors argue that the Grid will really come into its own only when people learn to build "virtual organisations". Such a virtual organisation could be a crisis-management team dealing with an earthquake or chemical spill. In such circumstances, the Grid would be ideal for analysing local weather, soil models, water supplies and local demographics. It could even help with communications, allowing field workers to discuss problems with office staff by means of video conferencing.

In another guise, the virtual organisation could be an industrial consortium developing, say, a passenger jet. The Grid would allow the consortium to run simulations of various combinations of components from different manufacturers, while keeping the proprietary know-how associated with each component concealed from other consortium members. In both cases, several unrelated types of calculation, using independent data sets, and running on a range of computers in different organisations that may not fully trust one another, have to be threaded together to achieve a coherent answer.

It is precisely because such undertakings would be a nightmare to negotiate over the Internet that the Grid has come into being. Unlike neatly defined science problems, which amaze more by their petabyte scale than their inherent complexity, virtual organisations are noteworthy because of their constantly shifting landscape of data and computer resources, and the authentication on which they rely. This is where the Grid would have its greatest value. It is such problems that could lead to new business models—just as the Internet created the conditions for e-commerce. Unfortunately, this is where the Grid's developers have barely scratched the surface.

Timing is all

The idea of distributed computing is as old as electronic computing. When devised more than 35 years ago, Multics—a multi-tasking operating system for mainframes that was finally retired last year, and is a distant ancestor of today's Linux—had many of the Grid's goals in its original mission statement (operation analogous to power services, system configurations that were changeable without having to reorganise the software, and so on). Other Grid precursors abound. The point is that the enthusiasm for the Grid today is not the result of some fresh and sudden insight into computer architecture. It is simply that the hardware has now improved enough to make an old idea work on a global scale.

Two hardware developments are bringing the Grid within reach. One is the rapid increase in network speeds. Today, a normal modem connection in the home has the same data-carrying capacity as the backbone of the Internet had in 1986. The latest version of the Internet protocol (IPv6) used for sending data from one computer to another will make it easier to standardise video conferencing and remote operation on other computers—core components of a Grid service.

Hardware providers are already anticipating the needs of the Grid in their planning. One example is Géant, a European network with transmission speeds measured in gigabits per second that is being touted by a company called Dante in Cambridge, England. Such data networks will be the equivalent of the high-voltage power cables that criss-cross countries.

The second factor that is helping to make the Grid possible is the growth in power of individual microprocessors. This continues to follow Moore's law, with processors doubling in power every 18 months. Today, even the humblest PC has enough spare processing power and storage capacity to handle the extra software baggage needed to run Grid applications locally. This is crucial, because no matter how clever the Grid may be, large amounts of computer code will still have to be transported to and from individual processors so that they have the tools to deal with any unpredictable task.

When the Grid really takes off, it will render obsolete much of the computing world as it is today. Supercomputers will be the first to feel the pressure—much as networked PCs consigned mainframe computers to the basement. Ignore for a moment the pronouncements by industry leaders and government steering committees. The best thing about the Grid is that it is unstoppable: it is just too good an idea to remain dormant now that most of the enabling technology is in place.

Like the Internet, the Linux operating system and countless other open-source endeavours before it, the key breakthrough that will make the Grid an everyday tool will doubtless come not from some committee in Brussels, Geneva or Washington, but from some renegade programmer in Helsinki or Honolulu. When? It could be any time during the next decade—perhaps even next week.

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REPORT: COMPUTER NETWORKS

Profit from peer-to-peer

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From The Economist print edition

Despite Napster's continuing travails, a number of fledgling firms are out to sell the idea of peer-to-peer computing to large enterprises

FOR the past year or so, the term peer-to-peer (P2P) has become synonymous with Napster, the controversial file-sharing program created by a 20-year-old software whiz called Shawn Fanning and now the subject of numerous lawsuits. Napster, much like its close cousin, Gnutella, allows users to transfer music files among themselves, circumventing many legal controls over copyright and creating a massive network of music libraries scattered about the Internet. Napster is a clever twist on a time-worn architecture dating back to the early days of the Internet. Now, a number of start-up firms are hoping to harness the same technology in the corporate world, promising to use the computing architecture to empower workers, unleash their creativity and solve communication problems.

As the embattled Napster struggles to switch to a subscription-based business model, companies such as Groove Networks, NextPage and XDegrees are trying to introduce the peer-to-peer style of computing into applications that allow workers to collaborate on joint projects (groupware), swap information, and share network resources such as storage space and other costly bits of equipment. Other firms, including Entropia and United Devices, are developing supercomputing applications that use the unbridled power of computers hooked to networks (see article). All of them believe fervently that the corporate world is fertile ground for P2P computing. The shift will, they say, do for computing in the 2000s what the PC did in the 1980s.

Sceptics have dismissed peer-to-peer as pure hype, pointing to unanswered questions about security and reliability that continue to dog the architecture, as well as the number of P2P start-ups that have failed in recent months. At a time when the corporate world is tightening its belt and sticking to tried-and-true ways of doing business, peer-to-peer computing is going to be a tough sell.

Despite attempts to distance themselves from Napster, the P2P start-ups have much to thank the embattled music service for. Napster gave credibility to the technology, proving that large-scale P2P networking using lowly personal computers is not only possible but can also be extremely powerful.

Actually, the concept is far from new. When the Internet's original architects built the "network of networks", computers were connected in peer fashion. Many of the services that made the Internet what it is today—eg, the Domain Name Service (DNS) directory, Usenet newsgroups and countless other features—were based on peer-to-peer architectures. But in those days, computers were hulking mainframes and there were far fewer of them tethered together.

The return of peer-to-peer came by way of a messaging platform. In 1996, a young Israeli firm called Mirabilis launched its popular ICQ ("I seek you") instant-messenger service using a peer-to-peer architecture to send messages between PCs connected to the Internet. Napster went several steps further, thanks to the faster microprocessors, greater storage capacity and faster connection speeds that had then become available, tying PCs together to share files over the Internet.

The most important lesson of Napster is that, surprisingly, people are willing to open their computers to, and share files with, complete strangers when they see value in doing so. In the process, they have shown how really large computer networks can be created rapidly through the piecemeal contribution of millions of individual PCs, each of which functions as a server as well as a client. Looked at this way, Napster has, in effect, 40m servers and systems administrators, keeping the network's management and infrastructure costs to a minimum.

Compared with corporate software, however, Napster is a simple program that does one thing—sharing music files. It is also not a pure P2P system. It uses a central server to link computers together to avoid the complexity of other peer-to-peer programs such as Gnutella, a file-sharing program popular among the high-tech community. Compared with Napster, Gnutella is nowhere near as easy to use and illustrates the danger of sharing files, including viruses that can spread quickly throughout a network.

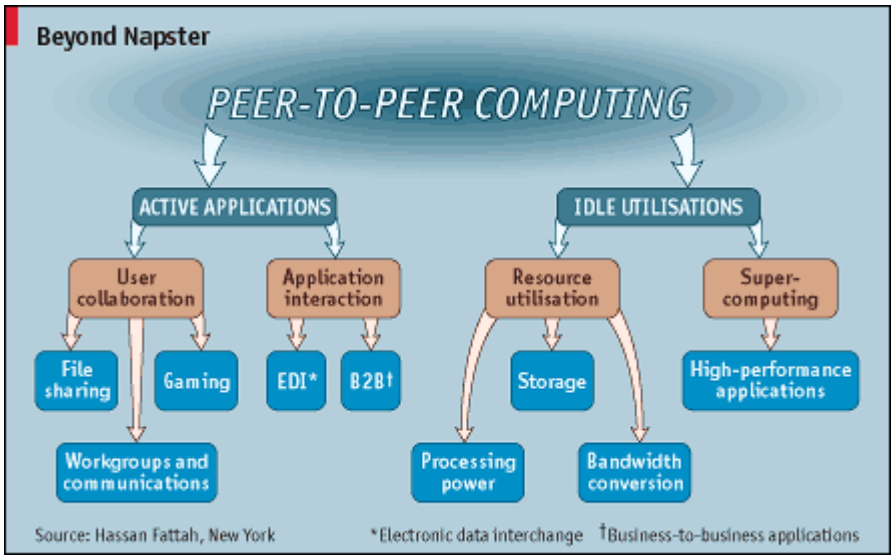
But what exactly is peer-to-peer computing? Like many other networking ideas, peer-to-peer is not a single concept, but a wide array of technologies. For some, peer-to-peer means that the PC and the server are one and the same thing. For others, it means that each PC's resources are shared with all other PCs. And for still others, it means that the network is itself the "computer". Purists define peer-to-peer as an architecture devoid of any form of centralisation. Pragmatists say it is simply a computer architecture that uses a central server but with peers that are all independent.

Perhaps the most articulate definition is offered by Clay Shirky, a venture capitalist and leading light in the peer-to-peer community. Mr Shirky links peer-to-peer's rise to the constraints of the DNS, the database that assigns addresses for computers connected to the Internet. At its most basic, says Mr Shirky, peer-to-peer is a swathe of applications that harness resources at the far edges of the Internet, where the machines have complete freedom (or, at least, significant autonomy) from the central servers. However, because such resources—PCs today, but mobile phones, PDAs (personal digital assistants) and other appliances in the near future—are often attached to modems that are allocated new addresses each time they dial their Internet service providers, Mr Shirky insists that P2P systems must use something other than DNS to link their machines together.

Under this definition, Napster is peer-to-peer because of the alternative DNS arrangement it employs (essentially the user's login name) and because of the independence of the computers involved. So, too, are instant-messenger services such as ICQ and America Online's Instant Messenger (AOL acquired ICQ in 1998), both of which transcend the traditional DNS architecture and devolve connection management to the individual machines. E-mail, by contrast, is not a P2P system because it relies on a central server.

Four applications in one

Altogether, peer-to-peer encompasses four separate activities: collaboration among users, interaction between software applications, efficient use of network resources, and supercomputing. The most prominent among these are the collaboration systems being developed by newcomers such as Groove Networks of Boston, Massachusetts, Endeavors Technology of Irvine, California, and Ikimbo of Herndon, Virginia. These systems combine Napster's file-sharing abilities with the instant-messaging capability of ICQ, all in a secure environment. Their main attraction is in encouraging ad hoc file sharing and communications among work-groups.



With Groove, for instance, workers can connect to colleagues in "virtual environments" to pursue all manner of collaborative work, ranging from brainstorming and event-planning to sharing documents and surfing the Internet together. Groove's system, like others, informs each user when colleagues ("buddies") are online, identifies them, and allows a user to connect to them from anywhere. Most important for the business world, once the software is launched, the service creates a secure space for

users to communicate—be they on the Internet or on a private Intranet behind a corporate firewall. There is no need to involve the company's service engineers; no need to establish some form of central organisation; and little concern about strangers gaining access to the corporate network.

Most of the other start-up firms developing collaborative P2P software offer variations on the same theme. What differentiates the likes of Groove and OpenCola of San Mateo, California, is their emphasis on building a peer-to-peer platform, upon which other software developers can add further functions. One way of doing this is to use the powerful XML (extensible mark-up language) protocol that allows developers to specify not only the layout of web-pages but also the nature of their content.

Despite all the attention given to collaboration, systems that allow software applications to interact with one another in a P2P fashion may be among the most promising. Systems from Oculus Technologies, NextPage and OpenDesign tie distributed data together for e-business, product design or knowledge management. Such programs use peer-to-peer as a means for sending data inputs and outputs from one application to another, or for linking countless machines into one giant database, maintaining the original producer's ownership of, say, research data or price lists while allowing contractors to use them.

Software-interaction technology permits companies to break down complex problems into smaller, more manageable ones, says Chris Williams, the chief executive of Oculus in Boston. The best part about such systems is that the process of collating data and ensuring that they are current is handled by those who produce them, which ensures that they are accurate and up-to-date. That makes it ideal for such applications as online exchanges and stock trading. Liquidnet of New York and WorldStreet of Boston, are both building buy-side systems aimed at Wall Street. The former aims to deliver a peer-to-peer trading system for a large (anonymous) pool of buyers, while the latter is developing tools for portfolio managers, analysts and traders.

Another area where interaction software's ability to deliver up-to-date information counts is searching the Internet. Typical search engines in use today deliver content that is at best 24 hours old. Even then, most search engines dredge up only a fraction of the information that is available on the Internet. OpenCola and Infrasearch, formerly in San Mateo but recently acquired by Sun Microsystems, are developing the next generation of search engines. These will use peer-to-peer techniques to deliver more timely and comprehensive information for media groups and other large content owners.

Hardest sell

Meanwhile, a number of young firms, including MojoNation of Mountain View, California, are working to create resource-utilisation programs that harness P2P's ability to store files, distribute content and share the processing power of other machines. The goal here is partly to cut costs on such hardware as storage, servers and other equipment, but also to help manage traffic on the network. Of all the potential services offered by P2P, this could be the hardest sell. There may be too many problems associated with security and complexity—not to mention the plummeting cost of storage and servers—to make such peer-to-peer services practical. Also, such services appear to be going up against the likes of Akamai, a firm whose caching technology helps speed the performance of websites. As the sceptics point out, offering savings on things that are only marginal costs anyway is hardly a viable business model.

Finally, there are the distributed computing services that deliver supercomputing power to companies needing massive number-crunching capacity occasionally but unwilling to pay millions of dollars for it. Essentially, the technology being developed by firms such as United Devices of Austin, Texas; Entropia of San Diego, California; and Applied Meta of Cambridge, Massachusetts, breaks down large computations into small parcels that can be distributed among computers tethered to a network. Each PC simultaneously computes the data and returns the results to a central computer that assembles the parts into a whole.

"Like many other networking ideas, P2P is not a single concept, but an array of technolgies."

The process can be used, for instance, to farm out individual frames of digital animation to different PCs for simultaneous rendering, and then to recombine the rendered frames into a fluid sequence. Once you add up the thousands or even millions of computers that can be roped in to do such calculations, the result is a parallel supercomputer with many teraflops (trillions of "floating point" operations per second) for a fraction of the cost of a supercomputer such as IBM's chess-playing champion, Deep Blue, or its forthcoming protein-folding colossus, Blue Gene.

The supercomputing start-up firms reckon that there are fortunes to be made from selling this kind of service to companies. The applications could be anything from genetic research to financial Monte Carlo probability simulations. Most of the firms in question are addressing problems that require brute force number-crunching—such as digital rendering, engineering design, pharmaceutical research and financial modelling.

Ironically, one of their bigger advantages is that distributed computing can be made to work with a wide variety of Unix and Windows programs that are available off the shelf, opening the door to far more potential customers. Supercomputers, by contrast, require specialised, custom-made software that can take years to write and cost millions of dollars.

Still, questions remain about whether companies are prepared to trust anonymous computer users around the world who may accidentally or maliciously tamper with their precious data. Not surprisingly, most of the young P2P firms are designing their bread-and-butter applications for enterprises that are large enough to do their distributed processing in-house. Most of the fledgling firms offering distributed supercomputing claim to have eager customers lining up. But analysts question how large this particular market can really become. Indeed, the closure of one start-up, Popular Power, in March, hints at the hardships that lie ahead. However, the distributed-computing folk insist that today's venture-capital market should not be taken as a measure of their future prospects.

As businesses go, peer-to-peer could not have happened at a worse time. Venture capital has dried up and companies have been less willing to spend on such projects. Despite the recent meltdown in high-tech investment, some $300m has poured into peer-to-peer companies, reckons Larry Cheng, a partner at Battery Ventures, a venture-capital firm based in Wellesley, Massachusetts. The best funded so far have been Groove, which has already garnered $60m; Entropia, which has collected $29m; NextPage, which has received $20m; and United Devices, which has $13m. Apart from these four companies, there is going to be little fresh capital for many of the other peer-to-peer ventures.

Dropping like flies

Would that signal the end of commercial P2P? Not necessarily. Even as the first swarm of peer-to-peer companies drop like flies, the know-how will permeate all manner of applications developed for large enterprises by Microsoft, Oracle, Sun Microsystems and others. Those behemoths have worked to emphasise their backing of the technology in recent months. Intel, the first big company to back peer-to-peer, has thrown its weight behind the technology, investing in several start-ups and helping guide the peer-to-peer working group to develop standards. Meanwhile, Microsoft unveiled in April its Project Hailstorm, as part of its software-as-service initiative (".Net"), which features peer-to-peer services prominently. Not to be outdone, Sun Microsystems unveiled its JXTA (pronounced "Juxta") set of standards for an open-source P2P platform. Sun also has begun investing in the area—most recently by acquiring Infrasearch for a reported $10m.

But for all the problems associated with the technology and financing, it is the psychology of the modern workplace that will make peer-to-peer a force to be reckoned with. The past decade has seen a dramatic shift in the nature of work. Company boundaries have grown wider, tying customers and suppliers ever closer, and increasing their reliance on temporary workers and consultants, while depending ever more on ad hoc work-groups. According to Daniel Pink, the author of "Free Agent Nation", such a workplace is increasingly devoid of fixed structures and clearly defined social and professional roles. Peer-to-peer matches the behaviour of modern corporations rather well.

Bonnie Nardi, an anthropologist at Hewlett-Packard in San Jose, California, who has studied the way people work today, has identified the rise of ad hoc networks as one of the most fundamental innovations in the workforce in recent years. These networks, which Ms Nardi calls "intensional networks", because of their intentional nature and inherent tension with other structures, have become a significant extension of work—and, increasingly, of the corporation itself. In turn, such self-managed messaging systems as ICQ and other peer-to-peer tools for collaboration then become the centre point of such networks, allowing users to contact peers freely, easily, and on their own terms.

Preliminary case studies of peer-to-peer applications confirm such trends in the business world. For example, United Technologies of Hartford, Connecticut, has used Oculus's interaction system to tie its engineering and design systems together, linking numerous databases and allowing its disparate design and development teams to communicate better. In the process, the system reduced the flow of wrong or out-dated information among the design teams, saving millions of dollars. In a similar manner, Ford

Motor Company of Dearborn, Michigan, has used the Oculus system to speed up its evaluation of design changes needed for improving fuel efficiency. The ability to link information across all of its applications and systems has allowed Ford to perform its design iterations much faster, saving the company anywhere from $5m to $15m per vehicle design programme.

Does all this mark the death of the corporate server? Far from it. Computer scientists note that, in the commercial world, peer-to-peer is appropriate only for applications that require direct communication. Indeed, the server will continue to reign supreme on the company's network for managing personnel and payrolls, enterprise planning and much more. In future, however, the server will provide higher level services instead of such menial chores as simply doling out files. After all, peer-to-peer is not a business model but a computer architecture—in short, a way of thinking. In the scramble to cash in on the P2P phenomenon, many seem to have forgotten that fact.

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REPORT: PORTABLE POWER

Batteries not included

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From The Economist print edition

Miniature fuel cells, refilled like cigarette lighters, could soon be replacing batteries in mobile phones, laptops and other gizmos

PICTURE a platoon entering hostile terrain. The location is too far from supply lines for bulky sensors or power-guzzling communications equipment to warn of an attack. Exposed and uncertain of the enemy's movements, the soldiers scatter handfuls of microsensors hither and yon throughout the danger zone—to sense sound, motion, body heat, human smell, even the metal of the enemy's weaponry. The devices contain communications chips that warn of danger by beaming low-powered optical or radio signals to a portable control unit at the camp. Best of all, the coin-sized detectors are so cheap that the platoon simply leaves them behind when it moves on.

Forerunner of a pocket-sized fuel cell

This scene is not as fanciful as it sounds. Even during the Vietnam war, the American armed forces were scattering portable sensors along jungle trails, though at huge cost. As the know-how for micromanufacturing such devices moves from the laboratory to the shopfloor, sensor/transmitters will become cheap enough to scatter-and-forget, like so many spent cartridge shells. But the same problem that plagued the Pentagon's microsniffers three decades ago still remains: the batteries needed to power them are far too bulky to do the job.

The trouble is that battery systems are pushing the upper limits of specific energy–the number of watt-hours they can store for a given weight. The best that conventional batteries can achieve theoretically is 300 watt-hours per kilogram (Wh/kg), though most manage barely half that in practice. And that is nowhere near enough for the armed forces. The Pentagon wants to deploy portable equipment needing 1,000Wh/kg by 2003 and up to 3,100Wh/kg by 2006. The physical properties of batteries make it impossible for them ever to achieve such heady goals. A wholly different form of portable power is therefore needed.

The armed forces are not the only customer for a battery replacement. The next generation of mobile phones, laptop computers and personal digital assistants will all come with wireless networking circuitry built in to them, demanding ever greater amounts of portable power. Samsung, a South Korean electronics firm, says its gadgets will need power sources capable of at least 500Wh/kg within a few years. Experts believe that even the most advanced lithium-polymer batteries could fall short of what will soon be in demand by a factor of ten. Hence the race around the world to find replacements for today's lightweight batteries. The best hope so far looks like being a miniaturised version of the fuel cell—the power source on board the *Apollo* spacecraft and now being tested for electric cars.

A thousand times smaller?

Essentially, a fuel cell is a battery that runs for as long as some form of external fuel is supplied. There are various types of fuel cell, but the most promising is the so-called "proton-exchange membrane" (PEM) fuel cell that turns hydrogen fuel and oxygen from the air into electricity and water.

A PEM fuel cell is made up of two electrodes (a cathode and an anode) with an electrolyte in the form of a polymer membrane between them. At the anode, the hydrogen atoms surrender their electrons under the influence of a platinum catalyst. The membrane is designed so that the stripped-down hydrogen atoms (ie, positively charged protons) can pass through it to the cathode, but the liberated (negatively charged) electrons have to go the long way round to the cathode via an external circuit. When the protons reach the cathode, they meet up with electrons and combine with oxygen from the air. If the fuel

cell is fed hydrogen direct, the only exhaust products are water vapour and heat. If that hydrogen is derived from methanol, then some carbon dioxide is also produced.

Can PEM fuel cells, which weigh 100 kilograms or more when used in prototype electric cars, be shrunk 1,000-fold to the size of a torch battery? Three factors are encouraging researchers at least to try. First, fuel cells sipping methanol or hydrogen have far higher energy densities than batteries to start with. Second, fuel cells can run for longer periods before needing to be refuelled. Third, refuelling can be done in seconds, unlike rechargeable batteries, which need an hour or more to be replenished. With fuel cells, users can simply replace spent fuel cartridges with new ones—in much the same way that low-powered dry batteries can be swapped when exhausted.

That is a heady vision—but not an outlandish one. In fact, fuel cells are likely to be used commercially sooner as portable-power units than as power sources for electric cars. For one thing, the portable-power business faces none of the tricky questions that plague fuel-cell car makers, such as where and how drivers will refill their fuel tanks with hydrogen or methanol. Mobile-phone users in future will be refilling their fuel-cell energy packs using capsules of methanol bought at kiosks or a newsagents, like butane for a cigarette lighter.

Medis's miniature fuel cells are expected to sell for around $15 each, and refills for $1 a cartridge

The best argument by far for the miniature fuel cell, however, is cost. Today's rechargeable batteries are exorbitantly expensive, costing $10,000 or more per kilowatt—compared with $50 per kilowatt for a typical petrol engine. So, as a replacement for rechargeable batteries, fuel cells do not have to meet tough cost criteria, unlike the brutal competition they face with the petrol engine. As Jerry Hallmark of Motorola, an American electronics firm, puts it: "We can afford to pay a few dollars for just a few square centimetres of fuel cells, but the car companies cannot."

Adventures in Lilliput

While the dozen or so groups seeking to make miniature fuel cells all have their own proprietary approaches, they fall into two distinct camps. One side wants to build on technology that has been demonstrated to work well in electric cars—a classical PEM fuel cell that is fed directly with hydrogen fuel—and then try to miniaturise it. The other side takes a radically different approach that has yet to work even on the scale of a car engine. This involves feeding a PEM fuel cell directly with methanol fuel—ie, without first "reforming" it to release its hydrogen.

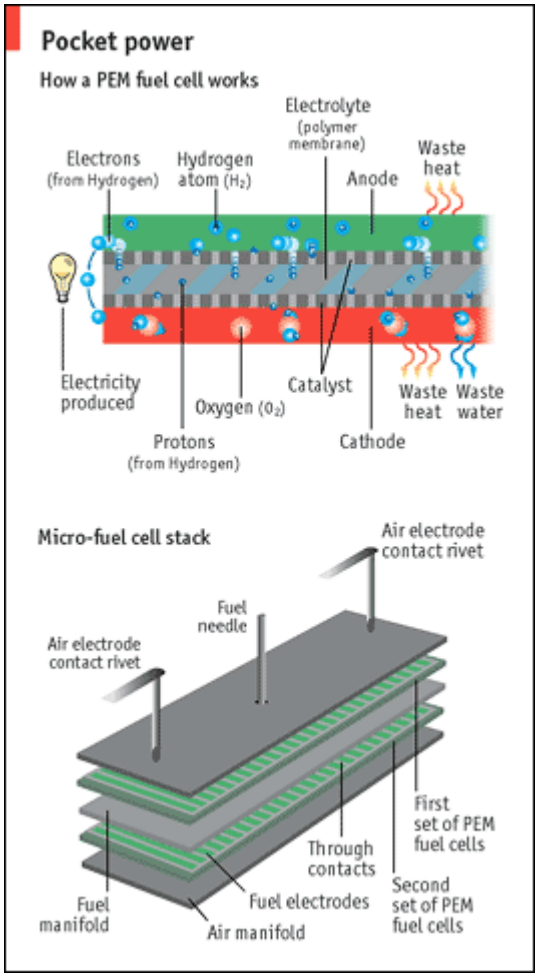
The attraction of the first approach—hydrogen fuel fed direct to the fuel cell—is that it is simple and works well in cars and stationary power plants. All that researchers now have to do is scale things down. But that may be easier said than done. Jesse Wainright of Case Western Reserve University in Cleveland, Ohio, is sceptical that the conventional "vertical stack" PEM system can really be scaled down, given the bulk of the fan, fuel pumps and other equipment that surrounds the stack. Also, such systems use high pressure to "push" the hydrogen through the stacks, since diffusion alone cannot do the trick. But high pressure is inappropriate for portable units that consumers handle and keep in a breast pocket.

To get round the problem, Dr Wainright's team has turned to micromanufacturing—a technique for fabricating miniature mechanical, chemical and biological devices on silicon wafers using tricks borrowed from the semiconductor industry. The beauty of the process is that dozens, even hundreds, of identical devices can be made simultaneously on a single wafer of silicon. When finished, they are diced up into individual chips and packaged.

To make its microscopic fuel cell, the Case team prepares silicon wafers in a semiconductor clean-room in the usual way. Then, using the semiconductor industry's standard lithographic tools, the fuel cell's various components—the anode, cathode, electrolyte and current collectors—are built up sequentially on the silicon substrate by repeatedly depositing thin films of metals and polymers, while selectively etching the unneeded bits of the structure away in baths of solvent. On a second wafer, holes are etched to allow the hydrogen to enter the cell and the two wafers then sealed as a sandwich.

The device is far from finished. Dr Wainright's group has yet to figure out how to dice up and package the sandwich, so that the

microelectronics inside are protected but the fuel cell and its associated sensors get access to the air they need to operate. One innovation the team has made is to adopt a planar configuration for the fuel cells, a technique that Motorola has also used in its own micromachined fuel cell. Because they lie side-by-side horizontally rather than in a traditional vertical stack, all of the cathodes are exposed to the air and all of the anodes exposed to the fuel. This makes fans and pumps unnecessary. Unfortunately, exposure to air affects shelf life.



The other big problem with the direct-hydrogen PEM approach is the gas itself. Hydrogen has such a low density that packing meaningful quantities of it within a given volume is tricky. This is a problem even in cars, let alone mobile phones or laptops. Since compressed hydrogen gas is out of the question, researchers are looking into various forms of reversible storage. The most exciting, albeit most speculative, idea for storing hydrogen involves so-called carbon nanotubes. Like diamond and graphite, these are crystalline forms of carbon. The attraction is that they have been shown in the laboratory to store and release large quantities of hydrogen gas. But turning such an intriguing possibility into a practical reality could take decades.

A better bet for the time being is to store the hydrogen in various metal hydride compounds. These work, but—like batteries—they can be unacceptably heavy. The other promising area of research involves chemical hydrides. The team at Case is investigating sodium borohydride (used in the famous detergent, Borax) as a means for storing hydrogen. The snag is that the performance of such chemical systems is affected by gravity. So stores using chemical hydrides only work in a particular orientation. Getting around this means adding pumps and motors–something that is not really practical in portable gizmos. Dr Wainright's team is trying to lick the orientation problem by using surface tension to neutralise the effects of gravity. But it could be three years or so before there is anything to show.

Mad about methanol

For all these reasons and more, most of the work on portable-power supplies in recent years has focused on the rival DMFC (direct methanol fuel cell) approach. When used in a fuel cell for powering an electric car, methanol cannot be used directly as fuel. Normally, its chemical structure has first to be reformed in a bulky, high-temperature unit that separates the hydrogen from the carbon in the fuel. The big breakthrough came in the early 1990s when a team at the California Institute of Technology's Jet Propulsion Laboratory (JPL) in Pasadena, California, managed to produce electricity by feeding methanol direct to a small PEM cell.

This advance, if translated into a workable product, could prove the key to cracking the portable-power problem. That is because methanol has several properties that make it a more attractive fuel than hydrogen for portable applications. For a start, unlike hydrogen, methanol is a liquid at room temperature, which makes handling easier. For the same reason, a given quantity of methanol in normal conditions has a much higher energy density than hydrogen.

Unfortunately, DMFCs have problems of their own. A thorny one is that the membrane used in PEM cells (Nafion, a polymer made by DuPont) is permeable to methanol and water. This is not a problem in direct hydrogen fuel cells, where the only inputs are pure hydrogen gas and oxygen from the air. However, because methanol can easily contaminate the cathode, it is usually diluted with water before being fed to a DMFC. Both the fuel and the water then ooze through that membrane, which greatly reduces the efficiency of the reaction—causing up to a fifth of the fuel to be lost as a result. Also, the migration of water across the membrane floods the cathode, inhibiting its access to oxygen from the air.

One way to remedy this is to create an "active" system, with pumps to recycle the water that has crossed over, and then regulate the methanol concentration. While this works, the result is too cumbersome for

portable use. As a result, researchers use an aqueous solution with less than 10% methanol. This reduces the crossover problem to more manageable levels, but the power density of the fuel cell suffers as a result.

As a result, some have turned to tinkering with the DMFC's various components. On membranes, for instance, a group from JPL and the University of Southern California in Los Angeles has replaced the Nafion membrane with an "interpenetrating polymer network" that reduces crossover by 90%. A fuel cell using this form of membrane is now being tested for the Pentagon. JPL is hoping to put together a "flatpack"—about the size of a battery used by a mobile phone—that can produce an impressive 800 milliwatts of power.

Others think that the membrane is not the problem. Shimshon Gottesfeld, head until recently of the DMFC programme at Los Alamos National Laboratories in New Mexico, claims that his team has already dramatically reduced methanol crossover losses to less than 10%, without changing the membrane. This was achieved instead through clever design of the membrane/electrode assembly and other components of the fuel cell. Dr Gottesfeld, a leading light in the business, has recently been poached by Mechanical Technology of Albany, New York, which has licensed a range of DMFC patents from Los Alamos.

Yet others are betting on catalysts. The chief problem here is that present catalysts rely on pricey materials such as platinum. The DMFC starts at a disadvantage because it needs at least ten times more platinum than a hydrogen PEM cell to achieve a comparable power output. Techniques such as "sputter deposition" may yet allow big reductions in the amount of platinum needed without a corresponding loss of power.

Manna from heaven?

Fuel cells still have some way to go before they dislodge batteries. However, there is a wild card that could turn the entire DMFC world on its head. Medis Technologies of New York claims to have solved the crossover problem that bedevils the DMFC with an entirely different approach. Rather than using a solid membrane as an electrolyte, the firm's fuel cell uses a liquid alkaline electrolyte. This approach echoes the original research in this area in the 1960s, but with a difference: the internal architecture that Medis Technologies has come up with actually seems to work.

As a result, the firm is able to use a much higher concentration of methanol fuel (around 30%), which boosts the system's power output. This approach also eliminates the need for complex fuel-mixing chambers and "microchannels" to spoon-feed the fuel. Instead, the firm's methanol mixture goes directly into the fuel cell. Robert Lifton, chairman and chief executive of Medis Technologies, boasts that his company's fuel cells are so flexible they can run on any alcohol. "We've got a lot of Russian researchers," he says, "and they've even got it running on vodka."

The firm claims that its laboratory test cell, unveiled at a recent conference in Washington, DC, organised by the Knowledge Foundation, already achieves a power density of some 60 milliwatts per square centimetre. (The best that conventional DMFCs have managed so far is around 4 milliwatts per square centimetre.) By the end of 2001, the company expects to improve its fuel cell's power density to 80 milliwatts per square centimetre—about that needed for a mobile phone. Researchers expect to get ten hours of life from such a unit. This falls short of the firm's goal of a month's use without recharging, but it expects to double its fuel cell's life over the coming year.

Medis Technologies is now building a pilot plant in Israel and hopes to have a commercial product by 2003 or 2004. Mr Lifton sees his firm's business model as being similar to the replacement strategy pioneered by Gillette: sell the razor (or fuel cell) cheap and reap profits from hooking customers on a proprietary type of blade (or refill cartridge). Once fully commercialised, Medis's miniature fuel cells are expected to sell for around $15 each, and refills for $1 a cartridge.

Many DMFC veterans remain sceptical about such claims. But Mr Lifton can point to two high-profile partnerships his firm has signed recently with multinationals: General Dynamics, an American defence contractor, which is keen to sell the technology to the Pentagon; and Sagem, a French electronics maker, which wants to incorporate that technology into its mobile phones.

Burning a hole in the pocket

While some firms involved in miniaturising the fuel cell claim they will have commercial products within a year, most experts think it will take more like three to five years before a viable product becomes available for laptops and mobile phones.

That is why some companies are taking interim steps before tackling the tough commercial market for mobile phones head on. Manhattan Scientifics of New York intends to launch its DMFC initially in the form of portable battery recharger rather than as a battery replacement. The firm has designed its fuel cell unit to be worn on the hip: while the phone is idle, its conventional battery will be recharged by the fuel cell. Motorola is also planning such a hybrid as its first step. Even Medis, which boasts a much bigger power output, plans to introduce its fuel cells as a hybrid “fast recharger” first, and only later develop a full-fledged replacement for batteries.

The advances made in miniaturising fuel cells are impressive. But so, too, are the remaining challenges. As one Sony executive says: “I don’t want my mobile phone to wet my pants if I put it in my pocket.” He notes that the aviation authorities in many countries have banned methanol and hydrogen on board commercial aircraft. Unless such regulations are changed, Sony sees no future for fuel cells in laptop computers or mobile phones. Any fuel-cell unit for a mobile phone must also work safely at temperatures inside a pocket or handbag.

That points to what may be the real test for this technology: consumer acceptance. Ordinary users have never seen such “energetic” devices before, except perhaps in their cars. Unlike batteries, DMFCs are sensitive to temperature; they must breathe air for survival; and they exhale carbon dioxide and water vapour. Before consumers rush to put such a device in their pockets, they are sure to demand that fuel cells beat batteries hands down on cost and performance, if not on safety. JPL’s Dr Narayanan sums it up best: “Let’s remember that batteries are nearly perfect in every way, except that they have to be recharged—and that is a very high hurdle indeed.”

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REPORT: TRANSPORT

Beyond cruise control

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Automated driving aids that will soon be fitted to cars will warn motorists of possible accidents. They may even help them actively to avoid crashes

DRIVING fast along a road outside Turin, snow-capped mountains beckon in the far distance. A dog suddenly runs out into the road. A collision looks inevitable when the driver fails to respond. At the last moment, the car executes a smooth, mathematically precise swerve around the dog and then returns to its lane. Throughout the manoeuvre, the driver's hands do not touch the wheel. The Lancia Nea is no computer simulation, but a real, road-going vehicle—though, as a technology demonstrator, not something the public can buy. (The dog is a remote-controlled toy on wheels.)

Motorists are understandably sceptical about cars that supposedly drive themselves. However, while auto-pilots for road vehicles remain a pipe-dream, car drivers may be surprised to learn how much technology designed to assist them is coming soon to their local showroom. These new models will not, of course, drive themselves. But their computer-aided sensors, decision-making software and the rest are intended to help motorists become both much safer and far better drivers. Even weekend drivers could soon be avoiding accidents with the skill of Michael Schumacher.

The idea of driver assistance started with the cruise-control devices that first appeared in American cars in the 1970s. When switched on, cruise control relieves the driver of the task of accelerating or braking to maintain a constant speed on a highway. Next came "adaptive" versions of cruise control, which appeared in Japan more recently. These relieve the driver of having to brake or accelerate in order to maintain a constant distance from the car in front. In the rest of the world, adaptive cruise control (ACC) has been an option only on luxury models, such as the Mercedes S-class and the Jaguar XKR. By the end of 2001, however, ACC will find its way into more ordinary cars. Fiat, for instance, is about to make it an option on its mid-range Punto models.

Researchers are tinkering with even cleverer forms of driver assistance—including collision warning, hazard avoidance, lane keeping, urban stop-and-go cruise, rural cruise and even control systems that stop cars from breaking the speed limit. The underlying idea is to add assistance to the driver, rather than take control away from him. Apart from some applications that may prevent cars from speeding illegally, the motorist will still have to decide personally whether to switch the driver assistance on or to drive unassisted. And because the driver can always override the computer assistance, he will remain in charge of the vehicle at all time—and therefore be legally responsible for it.

The last thing that the car companies want is to be held liable for a driver's incompetence or lack of attention, no matter how much he is assisted. It is bad enough when components such as tyres and structural members fail mechanically and cause accidents. Product liability in such instances has cost the car makers billions of dollars so far. The thought that class actions might ensue for "computer-assisted accidents" sends shivers through the motor industry.

Driving me crazy

Most of the new generation of assistance devices are derivatives, in one form or another, of the adaptive cruise-control system. ACC works by detecting the distance and speed of the vehicle ahead. The easiest way to do this is to use a small onboard radar system. This has the advantage of being accurate, reliable, cheap, capable of working at night and, given the right operating frequency (76-77 gigahertz is usually chosen), unaffected by rain or the moisture in fog.

The distance between the two vehicles is calculated, to within a few centimetres, using the time that it takes for pulses of the radar beam to travel to the car ahead and bounce back. By contrast, the speed of the car ahead is determined by measuring how the frequency of the radar beam echoed back has been altered by the Doppler effect. The difference in frequency between the transmitted and received signals (ie, the Doppler shift) gives a measure of how much faster or slower the vehicle ahead is travelling—just as the drop in pitch of an ambulance's siren indicates that it has passed you and is now getting farther away rather than closer.

Although ACC may not seem all that different from conventional cruise control, many safety engineers see the addition of radar detection as the key to a whole array of new sensors capable of improving the driver's knowledge of his immediate surroundings. In doing so, all the additional information pouring into the car gives the driver a far better early-warning system of trouble ahead—extending, in a sense, the perimeters of the vehicle and creating what researchers like to think of as a "virtual crumple zone".

Well, maybe. But not all safety experts think that ACC is such a great idea. Robert Ervin, a senior researcher at the University of Michigan's Transportation Research Institute, says that not enough is known about a driver's readiness and ability to intervene in an emergency, when he is relying on such semi-automated systems. What research there is suggests that it is hard for humans to remain vigilant when something they are watching out for happens only rarely. Dr Ervin finds that drivers using ACC tend to divert their attention away from driving. Because "headway conflicts" are the biggest burden in driving, removing them may cause drivers to reduce their vigilance unintentionally.

Pilots do it, why not motorists?

Hence the need for something to jar them, periodically, back to their senses. So, hot on the heels of ACC, expect to see safety systems that warn of potential collisions ahead. Forward crash warning uses the same radar-sensing technology as adaptive cruise control, and could be used with or without the ACC activated. Imagine you are driving along a road and another vehicle suddenly pulls out ahead at a distance less than that needed by the ACC's deceleration setting to slow your car down in time. In such circumstances, an alarm would be triggered to warn you to take emergency measures.

It is now common in America to fit a collision-warning system (CWS) to commercial vehicles, especially large trucks. Eaton Corporation, a leading manufacturer of automotive components based in Cleveland, Ohio, supplies CWS units for around $3,000 to fleet owners wanting to reduce accidents and related costs (such as litigation and insurance). The system has front and side radar and can track up to 20 vehicles at a time. Warnings are sent to the driver only on those vehicles in the truck's own lane. When the truck is travelling around a bend, a sensor calculates the turning rate, and the shape of the radar-reporting zone is changed to match the line of travel. Eaton claims that fleets using CWS see a 73% reduction in accidents. Meanwhile, Delphi Automotive Systems of Flint, Michigan, is developing a collision-warning system that detects objects 360° around the car.

If government-sponsored research goes as planned, a number of buses in America will get CWS by the end of 2001. But CWS will need to be a whole lot cheaper and smarter if it is to be fitted to private cars. Professional drivers are far more tolerant of alarms than everyday drivers. So careful thought will have to be given to deciding what hazards to report to the average driver and from what quadrant—ahead, either side, or the rear as well. If the alarm goes off too frequently, many motorists will switch the CWS off, or simply ignore its warning.

Even weeekend drivers could soon by avoiding accidents with the skill of Schumacher

Closer to market, however, is a modification to ACC known as an emergency braking aid. This uses the radar sensing and brake activation of ACC to improve the braking response. A small, additional braking force is provided when the radar sensors detect an emergency. The system does its stuff during the four-tenths of a second that it takes from when the foot first hits the pedal to when the brake pressure rises to its working threshold. Although the device shaves only one-tenth of a second off the braking lag, it is

enough to reduce speed by 5kph in most cases—and every little bit helps in an emergency. This is already standard equipment on DaimlerChrysler's Mercedes S-class and SL-class cars.

Much further ahead are the full emergency braking and forward collision-avoidance systems under development at Fiat, Nissan, DaimlerChrysler, Volvo and elsewhere. Here again, the technology is based on the ACC concept, although the sensors used in this case take into account stationary objects as well as moving ones. Nissan's Advanced Safety Vehicle, a concept car developed with Japan's Ministry of Transport, has automatic brake activation to stop the car, or at least reduce its collision speed, when the driver fails to respond. Plenty of problems with such systems remain to be solved. The single radar beam used in ACC, for instance, still gives too many false alarms for avoidance systems to be effective. Braking systems that automatically bring a vehicle safely to a standstill, or dramatically reduce the energy dissipated in a crash, look like taking at least three more years to perfect.

On the straight and narrow

Safety devices that warn the driver, or even correct his actions, when the car wanders from its lane, rely on visual sensors. A small digital camera keeps an eye on the road ahead, with the images produced being processed continuously so as to track the white lines making the lane. Any sideways deviation from that pattern causes the system to issue a warning. Lane-departure aids are about to be introduced in Japan by Subaru, Honda and Mitsubishi. Meanwhile, DaimlerChrysler has already started fitting lane-deviation systems to the trucks and buses it sells in Europe.

The type of alert varies. Mitsubishi uses visual and aural messages along with vibration of the steering wheel. DaimlerChrysler uses a drumming noise that resembles the sound produced when driving over lane-marking studs. The noise is fed to loudspeakers on either the left or right of the car depending on the direction of drift. DaimlerChrysler researchers say that people respond to such a warning intuitively, and automatically steer in the correct direction. Meanwhile, over in Munich, BMW is experimenting with "force feedback"—expressed as a slight increase in resistance of the steering wheel—to nudge drivers back into maintaining good lane discipline.

DaimlerChrysler plays drumming sounds to the driver when the car drifts from its lane

Outside of Japan, lane-departure systems—like collision-warning systems—will be introduced first in trucks and buses because of their cost. But they are still far from perfect. They can have difficulty tracking lane markers around bends, and so may be limited (at least initially) to use on expressways.

A more exotic form of ACC for country roads is being developed on prototype cars by an international consortium of European car manufacturers. This attempts to integrate anti-collision radar and road-recognition video sensors with global positioning information and a navigation map. The idea is to create a detailed and constantly moving map of the road ahead, which engages the car's brakes and accelerator to ensure that corners are not taken at the wrong speed. All the driver has to do is steer correctly.

The region behind a vehicle is also benefiting from the use of radar or cameras to eliminate blind spots and warn of overtaking vehicles. Ultrasonic detectors work like radar but are better for short distances (ie, up to five metres). They have already been tested as parking aids and could also be used to detect pedestrians behind the vehicle. Another form of driver assistance being developed in Europe is intelligent speed adaptation (see article).

Many of these new driving tools are being developed in parallel and conceived as integrated systems. But their introduction is creating a whole set of fresh problems for vehicle designers. The demands of handling so much more digital information within the vehicle, not to mention all the additional power-draining activators needed to do the job, are creating the need for more powerful computing and more

accurate GPS navigation, as well as beefier batteries and electrical systems.

Then there is the whole issue of “drive-by-wire”—the use of digital signalling instead of mechanical linkages to connect the driver to the vehicle’s throttle, brakes and steering units. When drive-by-wire arrives, the impact on the various forms of driver assistance will be profound.

All together now

When will all the disparate driver aids come together? One engineer at Fiat reckons that, realistically, it will take seven years to combine forward and sideways collision-warning systems with collision avoidance. The main problem is that all the systems under development are based on a simple highway environment. As yet, none is suited for use on complex urban roads. To manage that, the systems will need to recognise, predict and respond correctly to children, animals, wheelchairs, road signs, pedestrian crossings, car doors suddenly opening, and “weak traffic participants” such as bicycles and motorbikes.

It is for these reasons that aids for stop-and-go city driving have yet to appear. Urban driver assistance will need a much richer set of onboard sensors—including lasers, as well as radar, video and ultrasound—to provide the necessary accuracy and redundancy. Even then, the best that might emerge is a vehicle that promises merely to mitigate the effects of accidents rather than avoid them. The fully automated motor car is still a long way off. So motorists will have to get used to a world of semi-automation.

Not all automotive engineers are happy with even semi-automation. Some ask how driver assistance will affect traffic safety and flow. Others warn that combining ACC with automated steering is asking for trouble. The driver would be encouraged to “tune out” and become too dependent on the aid to handle situations manually when disaster strikes. They point to the lessons learned from the Three Mile Island nuclear accident, which showed that operators must never be allowed to become too dependent on automatic controls. Best that they be fully integrated into the control loop—like the train driver with a “dead-man’s handle” that applies the brakes if the hand falters.

Dr Ervin notes that before even semi-automated cars hit the roads, questions need to be answered about such issues as cognition, perception, psychology, risk adaptation and vigilance. Beyond those lie even more fundamental questions about the roles of operators in control systems generally. Should they be well-trained system managers who sit above the system but step in when things go wrong? Or should they be integral components that are wired into the system but free to exercise their special hands-on experience and decision-making abilities as a team member the instant an emergency happens?

Such differences in control philosophy go to the heart of a country’s historical and social beliefs. In parts of Europe and Asia where greater faith has been placed in *dirigisme* or central planning, there is a tendency to distrust the lowly operator and build control systems that report to a higher command. The same is largely true for societies that have nurtured an unshakeable faith in technology, as America had before Three Mile Island and the Apollo accidents.

Whatever the design philosophies that researchers come up with, car makers the world over are going to be introducing various forms of driver assistance long before they have answered questions beyond the simple ones of whether they can make the technology work. While all assistance is welcome, it would be a serious mistake if the driver were ever excluded, in even the smallest of ways, from the minute-by-minute task of having one eye on traffic and obstacles to the side, and the other on what was happening in the rear-view mirror, while at the same time keeping both firmly on the road ahead.

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REPORT

Sleeping policemen

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One form of driver assistance which is sure to create a fuss is intelligent speed adaptation (ISA)—a technology for forcing the motorist to observe the speed limit. This works by building into the car a digital map marked with local speed restrictions. The addition of GPS (global positioning system) navigation tells the car what the maximum speed on any given stretch of the road should be. Cars are then slowed down , or prevented from accelerating, whenever they are at or above the speed limit. One way to do this is to starve the engine of fuel. Another is to add a measure of play (ie, slack)to the accelerator pedal. A third is to make the accelerator harder to push down. In future drive–by–wire vehicles, the software would refuse requests from the accelerator pedal when above the speed limit.

Oliver Carsten of the Institute of Transport Studies at Leeds University in Britain believes that ISA is a form of driver assistance, because it helps the motorist keep within the law. However, Robert Ervin of the Transportation Research Institute at the University of Michigan disagrees. He argues that the ISA is not driver assistance because it does not enhance driving, but is adopted for social reasons.

Whatever it is called, the main justification for ISA is likely to be the high cost of speeding. Studies suggest that ISA could reduce the number of accidents by as much as 40%, and the number of fatal accidents by nearly 60%. It could also improve fuel efficiency, render the cost of “traffic calming” negligible, remove the need for enforcing speed limits with cameras and policemen, and reduce the costs of insurance.

Trials of the ISA systems have already been carried out in Sweden, Denmark, the Netherlands and Britain, and more are planned in Belgium and France. Although resistance is expected from drivers as well as from motor manufacturers, ISA could be introduced gradually, first with new cars and later as a retro–fitting to the remaining older cars—rather as seatbelts were introduced a generation ago. The trials show that a surprisingly large proportion of people come to accept ISA after they have lived with it for a while—again, much like the experience with seatbelts.

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REPORT

Look, no hands

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The notion of driverless vehicles is not totally absurd. Automated vehicles already whisk people around Paris, London and Vancouver. One snag: they run on rails over predetermined routes. Not having to contend with manually driven vehicles and pedestrians doing unpredictable things, fully automated rail systems are feasible to build.

But automated road vehicles could work the same way, if they had their own lanes and some kind of infrastructure for guidance. Trials such as the well-publicised one in San Diego, California, in 1997 and an automated highway planned in Japan suggest that the concept can be made to work. In these cases, stretches of highway have instruments embedded in the surface of the tarmac to guide vehicles via sensors that pick up and feed the signals from the road to an onboard autopilot.

Researchers at the Institute of Transportation Studies at the University of California, Berkeley, have developed a road reference and sensing system that accurately determines a vehicle's position and orientation relative to the lane's centre line. Permanent magnets costing less than $1 apiece are buried about four feet apart beneath the centre of each lane. Installation costs are around $6,000 per kilometre, a fraction of the cost of building the highway itself. The vehicles are then fitted with six magnetometers, which allow the onboard system to detect the centre of the lane and to steer along it.

The clever thing about the Berkeley system is that because each magnet is installed in the road in a binary fashion, with either its north or its south pole pointing upwards, it is possible to embed a binary code into the road for indicating mileposts, the curvature of bends or the gradients of hills. Japan's automated highway, which is expected to open in 2002–03, will use a derivative of the Berkeley system as part of a collection of advanced technologies both in the car and on the road.

Ultimately, the biggest problem in vehicle automation will be aligning the interests of local authorities, the motor industry and electronics manufacturers, as well as the motoring public, which all work on different time scales. When highways are built, they are expected to need little maintenance for their first ten years or so. Cars are replaced every six or seven years. Electronics change, and degrade, on even shorter time scales still. Warning: plenty of roadworks ahead.

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REPORT: BIO-ENGINEERING

The new organ-grinders

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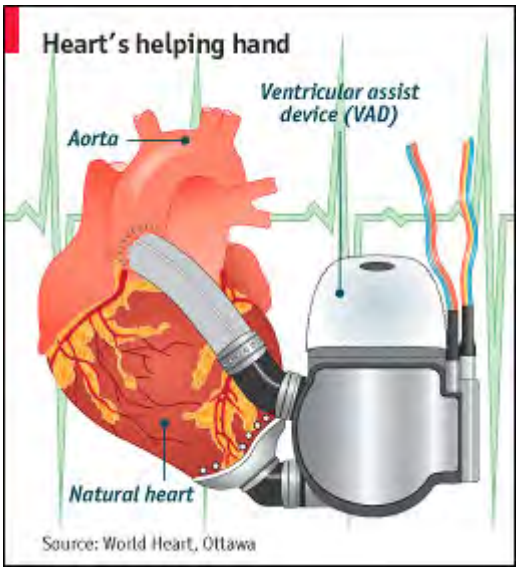
With genetic cures for killer diseases still years away, bio-engineers are developing a range of mechanical organs to replace worn-out parts of the human body. Treating people with heart disease, liver complaints or diabetes could soon become more like repairing a motor car

WHERE once they seemed utopian, early promises by genetic engineers to stave off disease, replenish stocks of organs and rejuvenate populations now appear unacceptable, even intimidating. To work these miracles of modern medicine, biologists need to explore genetic modification, stem-cell research and xenotransplantation (use of animal organs in humans). But the public outcry against such research has resulted in most of it being heavily regulated or banned outright.



Making matters worse, these research tools have proved difficult to use in therapy. Even one of the least controversial, but most valuable, applications of such research—growing healthy adult organs from adult stem cells—now seems decades off. Without such technology, the shortage of donor organs and the growing toll of diabetes and heart disease will only get worse.

The good news is that a number of companies are seeking remedies for such afflictions that avoid the political and scientific challenges posed by cloning. They are developing substitute blood and guts using traditional engineering metals, chemicals and plastics held together with nuts and bolts. Within a couple of years, repairing patients could be more like fixing worn out motor cars.

According to the World Health Organisation, heart disease is the deadliest ailment in the world. Thousands of patients need new hearts annually; most die waiting. In the next 25 years, as the number of diabetics worldwide doubles to 300m, the demand for fake pancreases will soar. Add to that an ageing population that is going to need better hearing, eyesight and livers. No surprise that the bionics industry is enjoying such robust growth.

One of the most eagerly-awaited products is artificial blood. Getting people to donate blood of different types in sufficient quantities is costly and time-consuming for clinics. Much of it goes to waste. After six weeks, stored blood starts to spoil and must be discarded. Collection clinics must certify each donation to be free of diseases such as HIV and hepatitis. But as recent tragedies have shown, such tests are far from foolproof. When labour costs are included, the price of a typical 250-millilitre unit of blood is $200-250. A proposal to filter out white blood cells, which may irritate some patients, could raise the price by a further $30-40.

Companies that make artificial blood are eager to cater for this demand, which amounts to some 14m units a year in America alone. The market for artificial blood in the United States is supplied by a Canadian firm called Hemosol and three American companies, Biopure, Northfield Laboratories and Alliance Pharmaceuticals. Hemosol, Biopure and Northfield manufacture solutions of purified haemoglobin, the molecule in blood that transports oxygen throughout the body. The Hemosol and Northfield products use haemoglobin that is harvested from human blood, while Biopure uses haemoglobin purified from cows. Such products are a sort of "eau de blood", providing haemoglobin's oxygen-carrying capacity without any of its infectious or abrasive ingredients.

Alliance's product, called Oxygene, takes this a step further. Oxygene contains no animal or human blood products whatsoever, being a milky emulsion of salt water and a compound called perflubron. The attraction of perflubron is that its molecules stow oxygen in their core. When they float past oxygen-starved tissue, the perflubron molecules swap their oxygen for carbon dioxide more readily than does

human haemoglobin. After a day or so in the bloodstream, the perflubron evaporates and is exhaled harmlessly by the patient. All of these blood substitutes are disease-free, cost about the same as natural blood, and have a shelf life of one to three years.

The best thing about artificial blood is that, containing no nasty proteins, it works with all blood types. Man-made organs are similarly compatible. Some get their universal appeal from the innocuous materials out of which they are made. Others make themselves acceptable by hiding their potential threats from the body's immune system. This special attribute of artificial organs in general—universal compatibility—is what has kick-started the business and attracted the hot money.

Not without reason. More than 75,000 Americans are waiting for a suitable organ to be donated. Only one in three will be lucky enough to get a transplant. And those that do will have to remain on a harsh regimen of drugs for the rest of their lives—to prevent their immune systems from rejecting the foreign tissue.

Have a heart

The idea of a totally artificial heart has set medical pulses racing. The first working attempt to make such a device, Jarvik-7, was tried out in several patients during the early 1980s. The problem with Jarvik-7 was that it required patients to remain constantly tethered to a machine the size of a refrigerator. Worse still, it caused deaths from clots and infection. Since then, artificial hearts have been used only as "bridges to transplant"—to tide patients over while a donor heart was found.

That has begun to change. Several American and Canadian firms are now getting regulatory approval for artificial heart devices that will remain in the body permanently. One device called AbioCor, which is made by Abiomed of Danvers, Massachusetts, replaces the natural heart entirely. Others, such as the HeartSaver from World Heart of Ottawa, replace or augment only the activity of the left ventricle—the lower chamber that pumps the blood through the body. Since it is the left ventricle that collapses in most cases of heart failure, such a "left-ventricular assist device" often provides enough help to allow the heart to start beating again with much of its natural tissue intact.

Made from materials such as titanium and Dacron, artificial hearts use a sensor to gauge the blood flow and a chamber to hold the blood while it is pumped by a battery-powered rotor. Oddly, a pulse is optional. Both the AbioCor and the HeartSaver generate one to keep the patient happy. The device rests in the chest cavity adjacent to the real heart. The internal batteries that power the device are recharged through the skin without the need for wires. A magnetic coil laid against the abdomen induces an electrical current in a matching magnetic coil stowed inside the patient's body.

Every part of the human body is being studied to see how it can be replicated artificially

Both Abiomed and World Heart have incorporated additional sensors to monitor such vital signs as heart rate and blood pressure. The HeartSaver will be able to transmit such data to a local controller using an infra-red wireless signal. With the control unit linked to the Internet, hospitals will be able continuously to monitor patients fitted with artificial hearts. Better still, a doctor in a hospital who notices that the device is beating too slowly could send instructions over the Internet to tell it to speed up.

World Heart already has approval for long-term use of its HeartSaver in Europe. The company hopes to start human trials in Canada before the end of the year. And now that the FDA has approved clinical trials in America, the first AbioCor could be implanted in a human patient by June. Initially, such a mechanical heart would cost as much as $60,000-100,000, though the price could fall by half once the device goes into mass production. Even after adding a further $40,000 for surgery, the total bill for installing an artificial heart would be considerably less than the $200,000 that transplanting a donor heart costs today.

The body electric

Despite its ingenuity, the mechanics of the natural heart are relatively straightforward. Even severed from nerves, it will continue to beat when placed in a bucket of correctly salted water. By contrast, other organs of the body are more multifunctional. And simulating them requires more complicated equipment.

Take the pancreas. This senses levels of glucose in the blood and releases insulin accordingly. MiniMed, a firm based in Northridge, California, manufactures external insulin pumps that can be programmed by patients to deliver appropriate doses of insulin. It is also testing a sensor that can continuously monitor blood sugar levels. Once the company mates these two technologies, the external pump could automatically gauge and administer microdoses of insulin. MiniMed hopes to make an implantable pump-and-sensor, thus erasing all evidence of the disease and its cure.

Nature's own materials

But designing and building such sensors and chemical pumps is costly. One alternative is to use nature's own equivalents—ie, living cells. Circe Biomedical of Lexington, Massachusetts, is testing an implantable "bio-artificial" pancreas that contains living pancreatic cells taken from pigs. The patient's blood flows through a graft into a membraneous tube that is surrounded by the pig pancreatic tissue. Through the membrane, the cells detect the level of glucose in the human bloodstream and release insulin as required. But since the pig cells are encased in a plastic housing, the patient's immune system never detects their presence—and therefore never mounts an attack. Every few months, the supply of pig pancreas cells is washed out and replenished through portholes that are embedded in the patient's abdomen.

Circe and other firms are pursuing a similar approach with artificial livers. No mechanical device has yet come close to replicating the host of chemical actions performed by liver cells. They cleanse the blood, break down and build complex molecules, and keep the blood volume on an even keel. So the artificial livers in development use actual liver cells—from pigs as well as from people—to do their chemical work for them. Such machines could be used to support patients in critical condition while they wait for a liver to be found for transplant.

Artificial livers work in much the same way as do kidney-dialysis machines. Blood is taken from the body, cleaned, treated and then replaced. As blood is collected from the patient's body, the fluid portion ("plasma") is extracted and the blood cells and other solid matter set aside. The plasma is then pushed through a charcoal column to extract the toxic chemicals. Next, it is oxygenated so that it can do its basic job and then enters a so-called bioreactor.

The bioreactor contains up to 5,000 hollow tubes made of a flexible membrane, clustered together in a plastic cylinder. Liver cells that have been cultured to grow on the outer surface of these tubes freely exchange biological molecules and water with blood passing through the membrane. As with the artificial pancreas, the membrane screens the foreign cells from the patient's immune system, which never realises that interlopers are meddling with its blood supply.

VitaGen of La Jolla, California, takes a similar approach, but with an important difference. Instead of pig cells or normal human cells, the firm uses a patented line of cloned human cells that are bred to be immortal. VitaGen's device is being tested in America. Meanwhile, Circe's HepatAssist should finish its clinical trials by the end of 2001.

Spare parts for the body shop

Such technologies for making artificial organs are only the beginning. Every part of the human body is now being studied to see how it can be replicated artificially or augmented in some way. Biomedical engineers at the University of Pittsburgh Medical Centre are developing prototypes of an artificial lung that can be strapped on a belt, rather like a mobile phone or personal digital assistant. A team led by William Federspiel, a veteran of Abiomed's artificial heart team, is working on an intravenous oxygenator that exchanges gas with the blood as it passes through a set of hollow fibres. A firm called Optobionics, based in Wheaton, Illinois, is trying to create a silicon chip that stimulates the visual cortex and may help to restore sight to the blind. And various types of substitute cartilage, bone and skin are working their way through clinical trials.

The technical hurdles that such firms have already overcome also lay the groundwork for future achievements. Most notably, they extend the range and capabilities of membranes that are safe to put inside the human body. They provide means for inserting power supplies within flesh. They allow animal tissue to be used safely in people. And, best of all, they detach the whole business of organ replacement from the tricky ethical questions associated with genetics, returning the endeavour to the practical, non-controversial realm of chemical and electronic engineering.

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INTELLECTUAL PROPERTY

Patently absurd?

Jun 21st 2001
From The Economist print edition

Patents that protect not only inventions but also ways of distributing and selling them are causing an uproar. But are more traditional patents—granted for inventions that are novel, non-obvious and useful—any better at promoting innovation?

A PATENT is the way of rewarding somebody for coming up with a worthy commercial idea. But putting a price on a good idea is a near-impossible task. Different countries have different schemes, although world bodies—such as the World Intellectual Property Organisation—have recently been trying to harmonise the patchwork of legal issues created by countries' different patent regimes. Since America is the innovation centre of the world and the place where new ways of protecting intellectual property first appear, developments there are watched keenly by entrepreneurs and policymakers everywhere.

The American constitution gives the government power to issue patents "to promote the progress of science and the useful arts". This remains a laudable goal. Recently, however, the Patent and Trademark Office (PTO) in Washington, DC, has received nothing but criticism for its efforts. In 1998, the agency landed itself in the soup when, at the behest of the courts, it began to issue patents for "business methods". Since then, it has been possible to protect not only gadgets and gizmos, but also the means for selling or distributing them. Among the most egregious examples were Amazon's patent on the "one-click" ordering system, Priceline's patent on "reverse auctions" on the web, and E-Data's patent on selling "material in a download fashion via the Internet".

This is no laughing matter. Prominent experts, such as Lawrence Lessig of Stanford Law School and Tim O'Reilly, a software publisher and champion of the open-source movement, fume that one-click purchasing or online auctions are trivial implementations of existing technology, not genuinely novel methods or concepts, which are what patents are meant to defend. Fencing off such obvious ideas, they argue, will throttle the growth of the Internet.

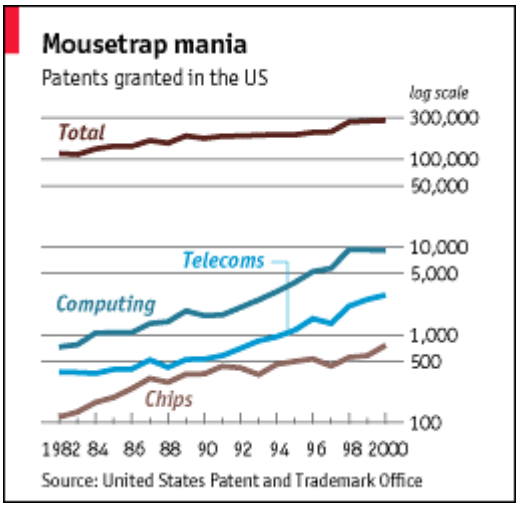
The continuing controversy over patents for business methods centres on how to ensure that the American patent office awards only "good" patents—that is, patents for ideas that meet the three original legal requirements of being truly novel, non-obvious and useful. However, important as it is, this question has obscured a more pressing debate on whether even "good" patents do what they are meant to do—reward invention and, thereby, encourage innovation.

Innovation does not happen by accident. It takes long hours and a great deal of investment—often many millions of dollars. By conferring a monopoly to exploit a particular technology for a fixed period of time (increased recently in America from 17 to 20 years to bring it into line with Europe), patents create incentives for investors to put money into risky new ideas. But monopolies create problems of their own. Firms or individuals holding patents must register and defend them, risking potentially crippling lawsuits. Those without patents must license them, or engage in inefficient and anti-competitive alliances.

Economists have tussled for decades over ways to balance these costs and benefits. That debate is now taking a fresh turn. Growing numbers of economists are unearthing evidence that America's patent regime is out of step with precisely those values it was designed to promote. Some believe that, in certain industries, strengthening intellectual-property protection accomplishes nothing positive. Others think that it may actually do some harm. If these economists are correct, patent-holders themselves may soon start clamouring for weaker, and not stronger, protection.

Thickets and commons

“Everything under the sun made by man is patentable,” asserted the American Supreme Court in a landmark decision in 1980 that left inventors scrambling to stake out their places in the sun. Between 1982 and 1992, the number of patents issued each year in America doubled from 55,000 to almost 110,000. “We are the patent office, not the rejection office,” said Bruce Lehman, the PTO’s commissioner at the time.Computers led the patent surge, with the number of related patents tripling between 1982 and 1992. Semiconductor patents increased fivefold over the same period (see chart).



As a result, Carl Shapiro, an economist at the Haas School of Business at the University of California, Berkeley, says that computing, semiconductor and information-technology firms now encounter a “thicket” of patents that constrain their inventiveness. This phenomenon has been dubbed the “Tragedy of the Anti-Commons”—in contrast to the classic “Tragedy of the Commons” that described how free resources such as fresh air and clean water could be over-used and destroyed by selfish agents. Here, the opposite occurs: when lots of property owners have to grant permission before a resource can be used, the result is that the resource tends to be chronically under-used. “In the case of patents,” says Mr Shapiro, “innovation is stifled.”

Do firms become more innovative when they increase their patenting activity? Studies of the most patent-conscious business of all—the semiconductor industry—suggest they do not. Rosemarie Ziedonis at Wharton Business School in Pennsylvania and Bronwyn Hall at Haas found that investment in R&D (a reasonable proxy for innovation) did not substantially increase during the industry’s most feverish period of patenting. Instead, semiconductor firms simply squeezed more patents out of each dollar they spent on R&D. From 1982 to 1992, the chip makers doubled their output of patents from 0.3 to 0.6 for every million dollars of R&D. That was at a time when the patent yield in other industries had barely budged.

Had the chip makers really become more innovative? Or had they simply spent more of their R&D money on applied development and less on blue-sky research? More to the point, had they just started harvesting patents from their laboratories more systematically? The companies claimed not to have shifted their research strategies to be concentrating on more practical things. For their part, the Wharton and Haas economists found no evidence to suggest that the firms had become more innovative as patent rights became stronger.

Tellingly, the consensus among employees who were questioned by the researchers was that the average “quality” of their firms’ patents had declined. Though patent quality is a difficult notion to measure, the number of times a patent is cited in the technical literature is the nearest thing to a yardstick. And it is a fact that citations made per semiconductor patent declined during the 1980s. On balance, semiconductor patents seemed to have become less useful.

The chip makers’ biggest response to increased patent protection came in changes to the way they

managed their patenting processes. For a start, they hired intellectual-property lawyers and introduced incentives for engineers to write patent applications—in a bid to increase the "output" from their R&D.

This affected the nature of the patents themselves. Interviewees told the two business school economists that, rather than patenting to win exclusive rights to a valuable new technology, patents were filed more for strategic purposes. In doing this, the companies sought to build up their portfolios of newly-won patents so that they could use them defensively as bargaining chips to ward off infringement suits, or offensively as a means of blocking competitors' products.

No surprise, then, that an increase in patent protection leads to an increase in patenting activity. What is surprising is that—as the evidence collected by Ms Ziedonis and Ms Hall suggests—increasing patent protection does not necessarily imply a rise in innovation. Indeed, the rush to acquire patent portfolios could slow down the generation of new ideas. Such "portfolio wars", as Ms Ziedonis and Ms Hall point out in the spring 2001 issue of the *Rand Journal of Economics*, could lock firms into a zero- or even negative-sum game. "In the end, none of them would succeed in increasing their returns to innovation," the authors warn.

Why did the semiconductor industry enter a portfolio war? The computer, electronic, semiconductor and information-technology industries are prone to such races because they depend on "complex" technologies, says Wesley Cohen, an economist at Carnegie Mellon University. In industries that use complex technology, the value of any particular patent depends critically on the ability to use related technologies. Since it is rare that any one company will hold all the patents involved, rival firms in complex industries depend on each other to get innovations to the market.

For instance, a new adder register for a microprocessor cannot function without the chip's timing circuit or memory bus. Intel may be extremely inventive, but it does not own the patents on all the components needed to make such an enormously complicated device as a Pentium 4 processor. Innovation at this level can be stifled if the developer cannot secure permission to use other key components.

In contrast, the "discrete" technologies used in the pharmaceutical, chemical and medical-equipment industries rely more on "stand-alone" patents. A new drug, for instance, does not depend on other patented drugs to do its job. In these industries, says Mr Cohen, the role of patents is not for bargaining purposes, but simply to secure greater returns from investment in research.

Skirting the thicket

Because of the strategic nature of their patenting, companies in complex industries run financial risks when they develop new products. Inventions made by semiconductor firms such as Intel and Motorola may unwittingly infringe dozens of patents owned by other companies. The offending manufacturer would then have to pay licensing fees to many of its competitors. Worse, it could be sued for patent infringement, even if the technology in question had been bought from some other firm. More disastrous still, it might go into mass production, only to find itself having to halt everything—at great cost—when a patent emerged that covered some aspect of the item being produced. For firms that have invested heavily in specialised plant and equipment to make a new product, "hold-up" (as patent lawyers call it) is more than just an inconvenience.

With so many problems, semiconductor, computing and telecoms companies have had strong incentives to find ways of trading intellectual property safely. Many firms have collaborated on carving out "litigation-free zones" within the patent thicket. By allowing manufacturers to avoid costly litigation, such arrangements benefit the producers significantly. Whether they do the same for consumers is another matter.

Firms such as Intel, IBM, Motorola and Sun Microsystems frequently use cross-licensing agreements to swap intellectual property with each other. The problem is that large organisations like these already enjoy powerful patent rights from their existing portfolios, whereas smaller firms and newcomers do not. By raising the bar for entry, cross-licensing can reduce competition. Moreover, powerful companies may coerce smaller ones with desirable technology into entering cross-licensing agreements by brandishing threats of hold-up or litigation.

A similar concern formed the substance of the case brought by America's Federal Trade Commission (FTC) against Intel. The proceedings were settled in early 1999 when Intel consented to provide its competitors with technical information about its products, but the FTC's broader worry was ignored. The

European Union's competition authorities in Brussels are now investigating further complaints against Intel for alleged anti-competitive practices.

Pooling patents

Another popular way of skirting the possibility of patent infringement is for two or more companies to pool their patents in a given field and to license them as a package, for a fixed fee, to each other and to third parties. Such "patent pools" come in handy when industries need to set technical standards or protocols for a new type of technology.

Because patent pools lead to co-operation among "horizontal competitors", antitrust authorities understandably view them with suspicion. In 1998, when America's Department of Justice approved a pool of DVD (digital video disc) patents shared by Philips, Sony and Pioneer, the department insisted that the pool contain only those patents deemed essential to the technical standard. The European Union has also made discouraging noises about the negative effects of patent pools on competition.

As a last resort, firms with conflicting patents can attempt to merge or pay one another to leave the field. Neither of these techniques necessarily advances competition. Indeed, such moves may well hinder it. "We cannot presume that private deals are in the public interest," says Dr Shapiro. But they may not be in the interest of firms either. While private settlements may help companies avoid litigation with one another, they can increase the chances of being sued by antitrust authorities.

Other strategies that bypass the patent system altogether may cause less damage to competition. Good old-fashioned secrecy may work just as well for generating returns from intellectual property. Firms try to ensure secrecy by binding employees with contractual non-compete clauses or non-disclosure agreements. Secretiveness sometimes verges on the paranoid. Scientists and engineers at Xerox's Palo Alto Research Centre (PARC), for instance, were discouraged from searching an online database of patents maintained by IBM. Xerox feared that if IBM tracked the pattern of inquiries made by its engineers at PARC, the computer giant could build a fairly accurate profile of the kind of research under way in the Palo Alto laboratories.

The importance of secrecy was borne out by a survey done recently by Carnegie Mellon's Mr Cohen with Richard Nelson of Columbia University and John Walsh at the University of Illinois. The team surveyed R&D managers at some 1,500 laboratories in 66 different industries. Overall, the managers rated secrecy and lead-time (ie, "first-mover advantage") as the most important mechanisms for appropriating returns on innovative products. For process innovations, secrecy led rankings, too.

In discrete industries, such as pharmaceuticals and medical equipment, managers regarded patents as the main way of protecting new products. For more complex industries, such as semiconductors and telecoms, managers felt only half as confident about patents. In a separate study, Mr Cohen has found evidence to suggest that the discrete industries' heightened perception of patent protection has encouraged them to be more innovative than is the case with the complex industries.

If patenting does not spur innovation in complex industries such as semiconductors, computers and telecoms, what does? Much of the return on R&D that they see appears to be wrapped up in the competitive advantage gained from having products with fairly long lead-times. Also, governments invariably provide hidden subsidies to firms in the form of R&D tax credits. And in many countries, the complex industries invariably get some form of special treatment—whether through government-sponsored collaborative research projects (think Sematech, Esprit, Third-Generation) or through non-tariff barriers and other ways of protecting national champions, defence contractors and so-called strategic industries.

In an ideal world, the American PTO would have the authority to distinguish between areas where strong patents promoted innovation and those where they hindered it. But there is no simple way of doing this. More realistically, policymakers need to examine how firms use property rights once they have them.

One thing is clear: the stronger patents are made, the greater the incentive to avoid them. And avoidance leads to anti-competitive practices. The alternative—secrecy coupled with first-mover advantage—may impede the informal flow of information as well as the formal trading of know-how between firms. That, also, is hardly a recipe for promoting innovation. On the other hand, cross-licensing appears to stimulate R&D—and, by inference, the pace of innovation.

Gauging the relative merits of these countervailing claims will take years. According to Joshua Lerner, an economist at Harvard Business School, “one of the big lessons that comes out of the economic literature on patents is that ‘one size fits all’ doesn’t make sense.” The implication is that—given the conflicting needs of different industries, different companies and different peoples around the world—the patenting authorities need to find a greater variety of tools for protecting intellectual property than they have at present.

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MONITOR

Reality check for video-on-demand

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Unlike television broadcasting, streaming video over the Internet gets more uneconomic the bigger the audience

A MAN walks into a motel lobby and asks the receptionist about the establishment's amenities. Without looking up from the book she is reading, a ruby-lipped beauty explains the limited nature of the accommodation—king-sized beds, doughnuts and coffee only. Prodding her further, the man inquires about the entertainment. To his astonishment, she replies that "all rooms have every movie ever made, in every language, any time—day or night."

The scene above comes from a television commercial produced by Qwest Communications, an American telecommunications company that specialises in expanding high-speed data links using fibre optics. With this and other catchy advertisements, Qwest is busy planting Internet fantasies of streaming video-on-demand (VOD) in the minds of consumers—dreams in which films and television programmes appear on people's TV sets at the touch of a button.

The visions bandied about by proponents of VOD are fanciful, to say the least. In reality, the future they extol is a decade or more away. Consider the active capacity of the Internet's backbone in North America. Built by companies such as MCI WorldCom, Williams Communications, Sprint and Qwest, this is capable of handling 500 gigabits per second (gbps).

Now consider the impact on such a backbone of downloading a typical piece of video. Most people who use the Internet are familiar with the tiny (3-inch by 3-inch) window used by "streaming" software such as RealPlayer or Microsoft's Windows Media Player to download and play video on a personal computer. Apart from the dismal size of the picture, at 20 frames per second the resolution is low and the image is jerky. Even so, to receive this far-from-adequate clip of VOD, a unique 300 kilobit per second (kbps) data stream has to be allocated for the duration of the transmission to each user. If the picture quality is improved to that used by a VHS video recorder, the transmission requirement increases to 500 kbps. To provide a picture quality as good as DVD (digital video disc), the data rate has to go up to 750 kbps.

What happens, then, if CNN has a 30-second clip of President Bush that 100,000 Americans choose to view at the same time? Even at the lowest resolution, the capacity required is 30 gbps. In other words, that one 3-inch by 3-inch picture on the computer screen is hogging no less than 6% of the entire Internet backbone capacity in North America. Putting that in broadcast terms, where television shows attract not 100,000 viewers but up to 20m at a time, suggests that even modest use of VOD could bring today's Internet to its knees.

Admittedly, the calculation assumes that all 100,000 users above query a central CNN server simultaneously. But it is rare that a single, central server has the responsibility for distributing content to users. More often than not, video content is "cached" locally with the help of Content Delivery Network (CDN) companies such as Akamai and iBeam. CDNs can be thought of as repeaters, stationed strategically to help manage the Internet traffic by avoiding the backbone or by finding intelligent routes through it. Thus, any audience—whether 100,000 or 5m—attempting to view the video clip of President Bush would be divided among a number of CDN sites where a copy of the speech would be cached.

However, CDNs have their own limitations. They work best in cases where the Internet usage is predictable or popular. So, for a live event—such as the infamous "Victoria's Secret" webcast—a CDN is the answer. The same is true for other VOD requests where a large number of users all want exactly the

same piece of content at the same time, such as an exclusive Internet première of a new Madonna video.

But if forecasts for 2005 are to be believed, some 20m-30m broadband users in America will be selecting from a smorgasbord of video entertainment on the Internet, ranging from digitised archives of Hollywood productions to libraries of TV sitcoms, documentaries, sporting events and other television fare. Jason Bazinet, an analyst at J.P. Morgan Chase, an investment bank, reckons that demand for streaming video will rise by 175% a year between now and 2005. By then, it will account for 45% of all the content on the Internet.

Such numbers are not to be taken lightly. For with so many more users selecting from such a wide range of content—what the industry calls “many-to-many” distribution—CDNs become less capable of distributing the load.

The good news is that the capacity of the Internet is growing spectacularly. Indeed, IDC, a market research company based in Framingham, Massachusetts, reckons that America is approaching a glut in bandwidth.

So, no problem for tomorrow’s viewers wishing to download video-on-demand? Well, not exactly. The trouble is that to light up all those new optical cables—and thus make them cost-effective—requires a commitment from Internet service providers (ISPs) that has yet to materialise. For good reason. Users are less than enthusiastic about mopping up the new Internet capacity because the only service they could use it for—video-on-demand—would cost them more to provide than they could collect in payments.

The mistake is to think that VOD is like television, except that it is piped down cables instead of being beamed through the air. Unfortunately, this is not the case. With their studios and transmitters in place, broadcasters are, in effect, fixed-cost producers. That means the more viewers a network attracts, the cheaper it becomes to add each new viewer. Also, as viewership increases, a broadcaster can secure higher advertising rates for its fixed-cost content, leading to fatter profit margins. That makes broadcasting a “win-win” proposition.

The same is not true for streaming video. With each additional user comes an additional cost, and at present there is no advertising model in place to offset those costs. That makes VOD a “lose-lose” proposition. “We have yet to prove that streaming has an ROI to it,” says Neal Goldman, an analyst at the Yankee Group, a management consultancy.

The figures bear this out. Consider content owners such as Warner or Home Box Office which, in the current market, would pay approximately one cent to stream one megabyte of video. The size of even a modest-sized movie is at least 1,000 megabytes. That means it would cost Warner or HBO $10 or more to deliver one movie to one viewer.

Reasonable? Not when you consider that the content provider would have to pay $1m to reach just 100,000 viewers. And that is for only one movie. Expand this to include a more substantial audience of, say, 5m viewers requesting multiple movies, and suddenly the cost to the content provider becomes prohibitive. So, why not pass the $10 cost for streaming a movie on to the consumer? Forget it. Few people are willing to pay cinema prices for armchair entertainment.

But even if the content owner could pass the $10 streaming cost on to the consumer, it would still lose money on every movie downloaded. Storage costs, service fees to ISPs and CDNs, and other overheads would make the whole business a losing proposition. And even if streaming costs were to drop to less than a third of a cent per megabyte—as J.P. Morgan Chase predicts will happen by 2005—it is still doubtful that such a business could turn a profit.

That has not stopped a number of enterprising firms from trying to find an answer. Radiance, based in Los Altos, California, has proposed a solution that seeks to manage the necessary bandwidth better. Scale Eight of San Francisco is examining new ways of storing the content. And the industry leaders, from telecoms firms to ISPs and CDNs, are trying every trick they know to expand their infrastructural reach and reduce their bandwidth costs.

Much development could take place by 2005. But even then, concerns about digital distribution and copyright—issues that have plagued the music industry for years—have yet to be fully addressed by the movie and television industries. Beyond that, problems of how best to bridge the “final mile” with broadband connections between the home and the local telephone exchange remain as thorny as ever.

Will the vision of instant access, via the Internet, to massive amounts of entertainment ever happen? Come back in 2010.

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E-strategy brief: Valeo

Less than the sum of its parts

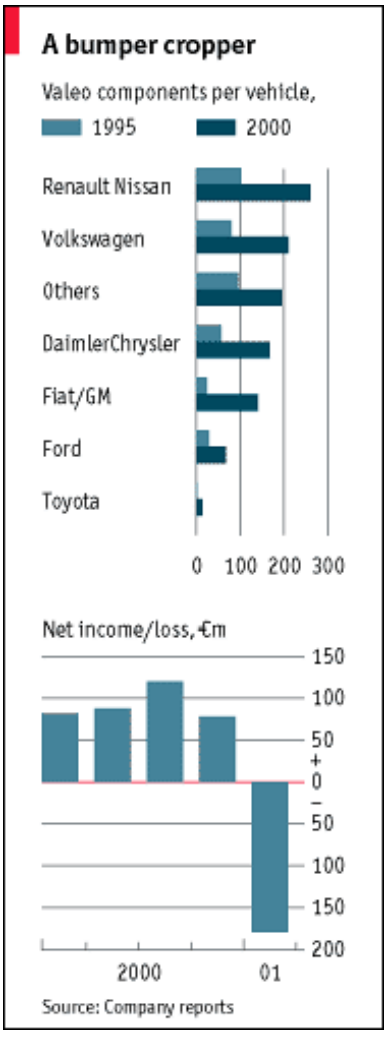
Jun 21st 2001
From The Economist print edition

Valeo, a troubled French car-parts maker, embraced the Internet late and then almost immediately fell upon hard times. Pure coincidence?

IT IS one of the world's top ten manufacturers of car components and makes everything from clutch systems to windscreen wipers. Recently, however, it opted for a change of gear. At a board meeting in March, Andre Navarri, Valeo's chairman and chief executive for all of ten months, was rudely shown the door. The company's annual results, battered by falling prices and declining orders from car manufacturers, had been badly received by the stockmarket when they were announced in February. In April the company reported a first-quarter loss of *euro*179m ($165m) and said that it was going through its worst crisis in 15 years (see chart).

Valeo's ownership structure partly explains the sudden change at the top. Some 20% of the group is held by CGIP, an investment company controlled by the Wendel family, an old French industrial dynasty. CGIP bought its stake five years ago and has grown impatient with Valeo's performance. At the beginning of the year it let slip that it would like to sell its holding in the company. Frustrated when it was unable to do so, it ousted Mr Navarri instead.

The executive board is now run by Thierry Morin, formerly the company's chief financial officer. A new supervisory board is headed by a 69-year-old, Noël Goutard, who was boss of Valeo from 1987 to 2000. A tough leader, Mr Goutard not only saw Valeo through its most recent big setback (a decade ago) and engineered its subsequent growth; he also laid the foundations of its e-business effort.



The group was no e-pioneer—it waited until mid-1999 before it was persuaded that Internet tools could really make a difference. But then it embraced e-business with enthusiasm. Under Mr Navarri, it began to harness the Internet in search of ambitious improvements, and some of its efforts are already yielding results—most notably, a project called "e-procurement@supplier-integration" (also known as e@si).

The longer-term impact of e-business promises to be profound: "We are expecting gains to come from all over the group," says Mr Morin. "We can use the Internet to restructure the way we work and to accelerate our processes so that we offer a more compelling package to our customers."

In particular, Valeo has begun to change its culture, using the Internet as glue to encourage competing internal businesses to co-operate for their mutual benefit. For example, it has more than 20 production lines making heat exchangers. When one makes an improvement, that information is now shared instantly with all the others via the Internet.

A brief study of Valeo's business shows clearly why the Internet has such huge potential. Like its competitors, the group is immensely complex: it produces a wide array of products, from single parts, such as a rear lamp, to fully assembled units, such as a rear hatch that combines lights, electronics, a wiper and security systems. Whatever it makes, however, it has to work closely with the car manufacturers that are its customers.

The more complex the product, the closer must be the co-operation. The company is increasingly involved at the earliest design stages of a new vehicle. “Way before anything is ever built by us, we need to know what the car will look like,” says Martin Haub, Valeo’s vice-president in charge of research and development. “Then we can do simulations to judge the efficiency of the system that we will provide.”

These can be astonishingly accurate. For instance, simulations of engine-cooling systems are typically correct to within 5% of the finished working product. But to achieve such accuracy, Valeo needs constantly to exchange information with its customers, something made immeasurably easier by the Internet.

Demand for such links with customers is expected to grow, not least because the car manufacturers are trying to shift more development costs to their suppliers. Mr Morin says that Valeo has no choice but to follow this trend if it is to remain a strategic partner of the big car makers, rather than a mere supplier. But, he adds, Valeo can also use the Internet to make its R&D spending more productive—by, for instance, linking to engineering centres in low-cost countries such as India. “We will have to spend more on R&D, but we must spend it far more productively,” he says.

Towards teamwork

Valeo’s complex structure is set to benefit from its use of the Internet. The group has some 180 production sites around the world, and more than 100 separate operating divisions. Traditionally, the organisation has been highly decentralised, with a lean headquarters supporting strongly independent business units. But the systems for sharing information between these units have been inadequate. Divisional managers, responsible for their own separate profit-and-loss accounts, have had little incentive to look for ways of working together for the benefit of the group as a whole.

That has been changing, say Valeo’s managers. Mr Haub reckons that the company has begun a necessary shift from being intranet-based and internally focused towards being web-based and looking out to its customers. “Customers expect seamless delivery, and they don’t care how we are organised. We have to work more as a team and forget our internal battles,” he says.

One big step was to complement the old divisional structures by introducing seven principal “domains”. These describe product areas in broad terms that relate to what actually happens inside a car. They include “interior thermal comfort”, “electric energy management” and “vehicle access and security”. By crossing the old divisional lines, these domains encourage teams to work together. They are also appealing to Valeo’s customers, because they give more coherence to what has been a daunting company structure.

The most far-reaching of Valeo’s efforts to harness the Internet is the e@si project. This is geared to so-called “non-production” goods, which means everything except the materials that Valeo uses to make products for customers. Such goods account for roughly 30% of the company’s *euro*6 billion annual purchasing bill.

Since it was started in April 2000, e@si has been aimed at four main areas:

• **Web catalogues**. Although these sound dull, they are important for component manufacturers. Valeo creates online catalogues that allow its staff to order office equipment and other non-production items faster and cheaper than before. As a rule of thumb, a product sold by Valeo or one of its competitors for $100 will have cost $60 in purchased goods and services. Between $15 and $20 of that will consist of non-production goods. Simply by posting well-organised and regularly updated purchasing catalogues, Valeo can benefit from less administration and lower costs, says Christine Bénard, group manager of purchasing and also boss of the e@si team.

• **E-negotiation**. Last year Valeo ran a modest $70m-worth of online auctions, but it hopes for five times as much this year. Using Internet software, it sends a so-called “request for quotation” (RFQ) to a chosen group of potential suppliers and then conducts a reverse auction to reach a contract price. One benefit of this is that Valeo can push down the prices it pays; another is that it helps the company to identify a group of favoured suppliers, something that should eventually reduce costs even further.

• **Purchasing knowledge management**. This project aims to improve the internal processes used to manage purchasing. A new Internet-based system monitors details of purchases and tries to make them more efficient—by, for example, lumping together small purchases from different departments into one

big one.

• **Supplier relationship management** (SRM). This may have the greatest potential to improve Valeo's performance. Today, the group struggles to keep control of its interactions with more than 4,000 suppliers. It has begun an effort to halve that number in one year, but even if it succeeds, the volume of transactions will remain immense. A single division, for instance, might receive more than 30m parts in one month, and Valeo has a constant battle to monitor their quality. Defective batches are a nightmare, says Ms Bénard, particularly if they reach the end-consumer. Each month there are roughly 200 such supplier-based incidents. The SRM project aims to reduce that figure by 75%.

When Valeo found faulty parts in the days before the Internet, it used to issue a paper report to the supplier concerned. Each division had its own report format for pursuing problems. But suppliers often ignored the reports because they were not followed up systematically.

Valeo's goal today is to standardise the way it tackles quality issues by installing a real-time, online system that cannot be ignored. It will flash immediate warning signals whenever there is a problem. This should make it easy to track the suppliers that have the best performance, and to push more work in their direction. (Eventually, Valeo wants to have only 300 core suppliers.) It should also mean that problems are fixed faster, so that they have less impact on production schedules.

In essence, e-business allows Valeo to pull together once-disparate internal processes and systems into a more coherent whole. This can be linked to suppliers and customers, using web-based tools that make it ever easier and faster to do business.

One effect of this change has been that the company's physical horizon has expanded. For example, it requires large numbers of specialist moulds, but European suppliers are inflexible and expensive. Thanks to the Internet, however, it can now find less expensive moulds in South Korea, a development that has given it more purchasing muscle in Europe.

Material realities

For all the long-term promise of e-business, Valeo offers a good example of short-term fundamentals proving more compelling. Mr Morin says he is committed to e-business because it has such potential to improve performance, and he has increased the resources available for projects with good short-term prospects. But he has also had to tackle basic operational matters and the sale of non-core businesses.

Valeo's current problems have an “old economy flavour and two main origins. First, like other car-component makers, the company is vulnerable to the fortunes of the big manufacturers that it supplies. In the second half of last year, America's big car makers in particular went into a steep decline, in tune with the broader slowdown in the economy. This year, Valeo expects the American market to shrink by another 20%.

In practice, Valeo has taken some apparently sensible steps to limit its exposure to the economic cycle. For a few years now, as much as 30% of its operations have been in America, reducing the group's traditional exposure to Europe. And it has increasingly focused on electronics, considered by most analysts to be the highest-margin and fastest-growing bit of the components business. Almost 60% of Valeo's sales now come from electrical and electronic systems.

That gives a certain irony to the second main cause of today's problems. In 1998, Mr Goutard spent *euro*1.6 billion buying ITT Electrical Systems, a specialist American manufacturer. The move was heralded as consolidating Valeo's future in electronics, but the deal has been a constant headache ever since. Mr Goutard did not spot that ITT's main factory at Rochester in New York was chronically inefficient. And once Valeo grasped the problem, it failed to tackle it. In a new strategic plan announced at the start of April, the company admitted that it still had to address serious operational problems at Rochester. It made a *euro*130m provision specifically to this end.

If it fails to solve its two big problems, Valeo could be vulnerable to takeover. If it succeeds, though, it could move on to become a textbook example of how the Internet can play a big part in changing the economics of an unglamorous industry. Many of the potential improvements are themselves unexciting—few pulses quicken at the sight of a web catalogue, for example—but they still have much to offer.

This indeed is one of the lessons learned by companies of all kinds over the past two or three years. Most of the benefits from e-business will not be found in occasional revolutionary insights, although these will doubtless occur, but in the painstaking integration of small improvements to established procedures and systems. Even where this nitty-gritty is done well, companies such as Valeo will remain vulnerable to the same old-economy failings that have always threatened them.

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Corporate profits

Where did all the money go?

Jun 21st 2001 | NEW YORK
From The Economist print edition

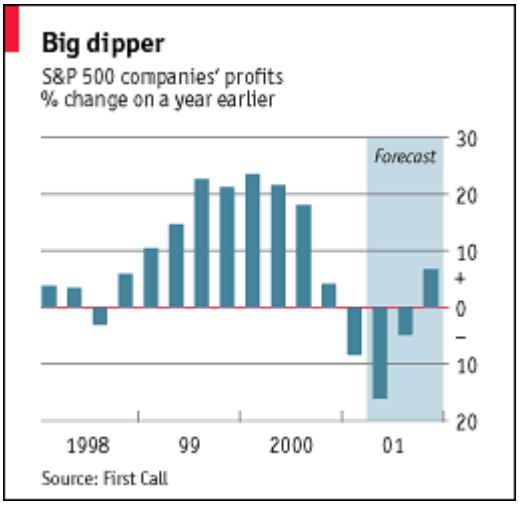
The days of bumper profits appear to be over for most companies. Things will probably get worse before they get better

THE bad news keeps on coming. On June 15th Nortel, a telecoms-equipment firm, announced the second-biggest quarterly loss ever by a company, of $19.2 billion. This was followed by other miserable revelations, including a 24% decline in quarterly profits at Goldman Sachs. Europe is suffering too. On June 20th Infineon, a German chip-making giant, shook stockmarkets with a warning that it could lose up to *euro*600m ($512m) in the second quarter. The list will grow as the pre-announcement season hits its stride in the coming weeks. Overall corporate profits seem certain to deteriorate further, even if the American economy rebounds in the second half of this year—and that is a big if.

So bad have things already got that when Oracle said on June 19th that it had beaten forecasts by a whisker (even though profits were 83% lower than a year earlier) and Larry Ellison, the software group's boss, said it "may" have reached bottom, he inspired widespread euphoria—never mind that Mr Ellison has been over-optimistic before, long protesting that Oracle would be immune to the economic slowdown.

Profits have fallen at a dramatic speed. In the first quarter of 2000, profits at S&P 500 firms were well up on a year earlier, according to First Call, a research firm (see chart). In the first quarter of 2001, they were down by 6.1%. Analysts expect the fall to be 14-16% in the second quarter. They are now forecasting that profits will start edging up again in the fourth quarter. But judging by the recent spate of profit warnings, that upturn may be postponed until early 2002.

There are a few glimmers of hope amid all this bad news. One is that, after a record crop of profit warnings in the first quarter, the pace of negative pre-announcements may be slowing slightly this time round (although the number for the second quarter might still top 1,000). Nor is the picture uniformly dire across the economy. It is true that profits in the technology segment of the S&P 500 fell by 40% year-on-year in the first quarter, and are expected to decline by 60% in the second quarter. But some 57% of the firms in the S&P 500 have actually delivered increasing year-on-year profits in each of the past four quarters, points out *Aeltus Weekly*, an investment newsletter.



It is also possible that analysts may be overdoing the gloom, just as they were too optimistic during the boom. They are expecting lower profits this year than the macroeconomic forecasters are, which is almost unprecedented. Certainly, companies are keen to get as much bad news as they can out of the way now, in the hope of being able to grow rapidly from a low base when the recovery begins. Nortel's huge loss reflected restructuring charges due to acquisition write-offs—although even without those charges it would have recorded the biggest quarterly operating loss ever, of $1.5 billion. Nortel bought 21 firms between 1997 and 2000. Analysts fret that similar write-offs may await other big high-tech acquirers such as Cisco, with 40 takeovers during the same period; or Lucent, with 23; or Sun, with 21.

Massaging the numbers down

According to Abby Joseph Cohen, a famously bullish analyst at Goldman Sachs, “profits will remain somewhat gloomier for longer than is justified by fundamentals”, as firms manage their earnings downwards to create growth potential. There are, however, other reasons to expect pessimism to spread even further.

For one thing, the economy is continuing to slow—to such an extent that the Federal Reserve looks likely to cut interest rates by a further 50 basis points on June 27th. Industrial output fell by 0.8% in May. Over the past six months, manufacturing output has fallen by 8% at an annual rate. According to Stephen Roach, an economist at Morgan Stanley, having slashed all the technology spending they could, company bosses are now turning eagerly to the most painful cuts of all, jobs. That means unemployment will continue to rise.

Even if the economy rebounds in the second half of this year, it may not produce a matching bounce in profits, says Bruce Kasman of J.P. Morgan Chase. That is because the labour market would remain tight, so labour costs, which have been growing at over 6% a year, could continue to rise at an unsustainable rate. On top of this, the inventory correction that has been under way since last summer, as firms run down unexpected increases in stock, still has some way to go.

Sooner or later, the business cycle will turn up again. The question then will be how fast profits can grow. It is extremely hard to forecast such things. As Pip Coburn of UBS Warburg points out, in 2000 average analysts’ estimates of profits at the start of the year differed from the actual end-of-year outcome by 20% or more in 62% of cases for technology shares, and in almost one-third of cases for other shares. In earlier years, the experts were just as far off the mark.

Yet there are several reasons to think that profit growth may be slower in future than in the gung-ho recent past. First, productivity can be expected to rise at a slower rate than it has done of late. The first-quarter decline in productivity of 1.4% at an annual rate has led most economists to lower their view of likely productivity growth from the miraculous “new economy” rates they had been expecting. This will make it harder for profits to remain immune to rising labour costs.

Another factor is the cooking of books. The spectacular growth in profits during the 1990s was partly due to dodgy accounting, which may be less helpful in future. According to Bob Barbera of Hoenig, an investment bank, thanks to the way in which employee share options are treated (or rather, not treated) in the accounts, the stated operating profits of S&P 500 companies rose at a much faster rate than profits measured in the national accounts, which treat option grants as an expense to the firm. Thus, in the 1990s, profits at S&P 500 companies tripled, but profits recorded in the national accounts merely doubled. If companies have to pay employees more in cash than in options in future, which seems likely, their costs will rise and profit growth will probably move closer to the more modest national accounts measure.

Technological terrors

Worries about future profit growth are greatest in the technology industries, as nobody really knows when capital spending will resume once the current panic is over. Between 1993 and 2000, technology was the first- or second-fastest sector for profit growth in seven out of eight years—but it is likely to be the worst performer this year.

Whether technology-industry profits actually grew as fast in recent years as they appeared to do is increasingly being questioned. A recent study by Gary Schieneman, Steven Milunovich and Lisa Liu, all analysts at Merrill Lynch, examined 37 leading technology companies. The study found that accounting properly for options and non-operating expenses reduced the firms’ profits by 25% on average in 2000. Some firms may also have gained higher profits from not making contributions to their pension funds, because the value of the assets in the funds rose with the stockmarket in recent years. All told, accounting changes could have turned profits into losses at Brocade, eBay, Exodus, Juniper, Lucent, Siebel and Yahoo! On the other hand, the figures might have been better than reported at Amazon, Ariba and Nortel, among others.

Ultimately, there is no reason to expect that overall profits will continue to grow at a faster rate than nominal GDP, says Josef Lakonishok, an economist at the University of Illinois who has studied long-term trends in profitability. Indeed, after a while, that becomes mathematically impossible. The period in

which profits have increased as a share of GDP was drawing to a close even before the economic slowdown, as labour grabbed a larger slice of the pie. Profit increases of around 6% a year may become the norm in future—broadly in line with the speed at which American profits have grown during the past 50 years, says Mr Lakonishok. In the current climate, even that would feel like winning the lottery.

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Microsoft and AOL

From friends to foes

Jun 21st 2001 | SAN FRANCISCO
From The Economist print edition

The two technology giants are set to become bitter enemies

IN 1996, AOL and Microsoft cut a deal that made high-tech history. AOL agreed to build its service around Microsoft's web browser, Internet Explorer. In exchange, Microsoft gave AOL's software prominence on its Windows operating system. The arrangement boosted both firms. It helped Microsoft to win the browser war against Netscape, and it helped AOL to pick up millions of new subscribers.

The failure of the two companies to renew their deal, which was announced on June 16th after weeks of negotiations, could prove just as significant. It is true that the absence of an agreement will have only mild short-term consequences: although AOL's software will not now be attached to Windows XP, Microsoft's new operating system, due out on October 25th, AOL (now AOL Time Warner) can still strike deals with PC makers to load the program on to their machines. Rather, the impact will be felt in the long run. The collapse of the talks could signal the beginning of a titanic battle between the two firms.

Both parties had hoped to gain something from a new agreement. AOL wanted once more to ensure that its software had top billing on computer screens; Microsoft's main objective was to use AOL to gain market share for its Windows Media Player, a program that lets PC users listen to music or watch videos. Microsoft wanted AOL, among other things, to offer its audiovisual content in a format that can be played by Windows Media Player. For now, this content works only on software provided by RealNetworks.

Why the negotiations failed depends on whom you ask. AOL says it was because Microsoft wanted to banish RealNetworks' music-and-video program from AOL software so that Microsoft could gain "as much control of music on the Internet as possible". Nonsense, retorts Microsoft. Several issues led to the collapse of the negotiations, it says, not least that AOL refused to make its instant-messaging service inter-operable with Microsoft's because it hopes to continue to dominate this technology.

Spinning aside, the convergence of software and online services has put the two companies on a collision course that makes it hard to cut deals. Microsoft, having realised that winning the browser war was not enough to give it control of the Internet, is increasingly encroaching on AOL's territory. Windows XP comes bundled with many of the services AOL offers, including new instant-messaging features.

The battle could turn bloody. Much of it may be fought not in the marketplace, but in court. According to AOL insiders, the firm had agreed not to sue Microsoft on antitrust so long as the two companies had a technology-swapping pact. Now it is free to let its lawyers loose. Only recently, AOL gave warning that Microsoft was again abusing its Windows monopoly to push into new markets. A similar claim set off the government's big antitrust trial against the software giant (in which the appeals court is expected to rule any day now).

If war now looks inevitable, it is also unfortunate. A clash between AOL and Microsoft would be bad for consumers, because it could leave them having to grapple with competing standards. PC users want to see the two companies developing common technical rules and competing on implementation, rather than each trying to dominate the standard for online music, instant messaging and so on. Sadly, that looks less likely than ever.

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Selling petrol in China

Pump action

Jun 21st 2001 | BEIJING
From The Economist print edition

A race has begun for control of China's 90,000 forecourts

PANOS

UNTIL recently, China's oil industry took its orders from the government and disdained the marketplace. Now the country's landscape is being transformed by a ferocious battle for market share. This is likely to be fought between China's two newly created oil giants and the foreign multinationals that are eager to gain a foothold in the potentially lucrative business of running Chinese petrol stations.

The prospect of entry into the World Trade Organisation (WTO) has prompted a radical overhaul of China's oil industry. In 1998, the government decided to turn two big monopolies—one mainly responsible for refining and distribution, the other for exploration and production—into competitive, western-style "oil majors" engaged in the entire range of oil-related activities. The two new companies, Sinopec and PetroChina, were listed overseas last year and are using some of the billions of dollars they raised to buy up petrol stations. The companies' logos (both predominantly red) have been emblazoned across forecourts everywhere.

China has about 90,000 petrol stations—two-thirds as many as in the world's biggest consumer of petroleum, America. Unlike the American market, which is mostly controlled by a handful of big oil companies, China's was almost virgin territory before the two domestic giants decided to do battle. Most of the petrol stations were owned by local governments, rural collectives or private individuals. Some of these offered dubious incentives to lure customers, ranging from cheap smuggled petrol to prostitutes.

The Chinese companies feared that, if they did not move quickly, there was a risk that WTO entry would allow foreign multinationals to gobble up this crucial business. China has agreed to open up its petrol retailing within three years of joining the WTO, and distribution within five years. In the past few months, Sinopec and PetroChina have duly bought many thousands of petrol-selling outlets across the country, pushing prices for prime sites to ridiculous heights: some have sold for as much as $1m each, probably twice as much as their true worth. In recent weeks, as Sinopec and PetroChina count the costs of their race, the rate of acquisition has begun to slow down.

It could take some years before the Chinese companies see much return on their new purchases. That is why they now see joint ventures with foreign companies as an attractive way of gaining investment and expertise to enhance profitability. With a quarter of China's petrol stations now under their control, including most of the best ones, the big two feel they can afford to let the foreigners in.

BP, ExxonMobil and Royal Dutch/Shell are heading the race to set up joint ventures. They have their eyes less on immediate profits than on the long term: building up brand recognition, and also hoping that one day their retail operations might become integrated with their upstream ventures. "This is about strategic positioning," says Scott Roberts of Cambridge Energy Research Associates.

Long before the PetroChina/Sinopec race started, foreign companies were entering China through the back door, setting up as many as 300 outlets in various parts of the country, mostly by forming partnerships with local governments. Now they have a chance of gaining a firmer foothold. BP, the largest foreign investor in China's energy industry, has announced plans to launch 1,000 joint ventures with PetroChina and 500 with Sinopec by 2007. That may be a small share of the Chinese market, but it will still amount to a retail network about the size of the one BP has in Britain. ExxonMobil and Shell also plan to create 500 joint-venture petrol stations apiece with Sinopec.

Purchasing horsepower

This is all a (fairly safe) bet on more cars and roads. China still has fewer privately owned cars per head than almost any other country in the world. But car ownership is increasing rapidly as wages rise (see chart). WTO entry will make imported cars cheaper. At the same time, China is spending billions of dollars extending its motorway network.

Along China's highways, the logos of foreign oil companies will sprout in the years ahead—alongside those of PetroChina and Sinopec. But that is only half the battle, says Paul Bernard, an analyst with Goldman Sachs in Hong Kong. The big Chinese companies will continue to maintain their grip over not only the retail sector, but distribution as well. Thanks to skilful manoeuvring in advance of WTO membership, China will retain control of what its officials call the "lifeline" of its oil industry.

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Face value

A Slavic sun king

Jun 21st 2001
From The Economist print edition

Vaclav Fischer has created something that is still rare in Central Europe: a trusted brand

IT SHOULD come as no surprise that Skoda cars and Budweiser Budvar beer are the most recognised brand-names in the Czech Republic. Just behind them, however, is a company that few non-Czechs will have heard of: Fischer. That is a strangely lofty situation for a mere travel agency. But then Czechs consider the company's founder and sole owner, 47-year-old Vaclav Fischer, to be their most successful entrepreneur. He is certainly a rare tycoon for the former communist world: squeaky-clean, soft-spoken, politically independent and more interested in serving than gouging his customers.

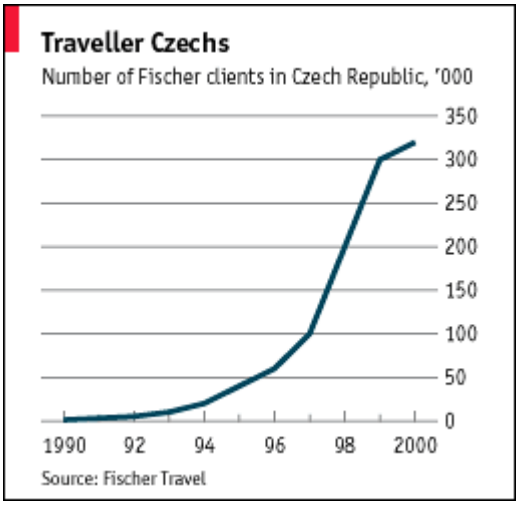
Almost every Bohemian town square is emblazoned with the blue-and-white livery of a Fischer travel agency. Inside, uniformed staff offer glossy brochures promising breaks to Acapulco, or at least Ibiza—nothing special in the West, but a welcome consumer revolution for sun-starved Slavs raised on communist travel monopolies. Fischer hopes for sales of $200m this year. It accounts for about half the 500,000 package holidays sold in the Czech Republic each year; in Western Europe, the biggest tour operators seldom have more than a 20% market share.

Mr Fischer spent a happy youth in Prague, but communism never suited him. In 1978, on the day he graduated from the Prague School of Economics, he fled Czechoslovakia. He went first to Zurich and then to Hamburg where, in 1980, he set up his first travel agency, Fischer Reisen. The timing was propitious, coinciding with an explosion in the West German package-holiday business. By 1985, Fischer Reisen had become West Germany's fifth-largest travel agency. Mr Fischer puts its success down to "the right balance of service and price". His ability to strike deals with reliable partners, crucial in the travel business, also helped.

Looking east at his newly liberated homeland, Mr Fischer spotted, earlier and more clearly than anybody else, a golden business opportunity. Service was anathema for state-run travel agencies, which were, besides, riddled with spies and hardline communists with few, if any, business contacts in Western Europe. In the Czech Republic, at least, there was a tradition of travel to build on: the Czech president, Vaclav Havel, recalls childhood family holidays at the Belgian and Italian seaside. Such genteel travel ended with communism. Instead, after the dark days of Stalinism came a new tradition: package holidays for all, naturally within the communist block. Even a steel worker could look forward to two weeks on the Bulgarian strand, albeit in a tawdry hotel. The Czechs of 1990 were not rich, but with the cage door thrown open (well, almost open—visas were still a pain) many were prepared to spend a good portion of their incomes on finally seeing the world.

Mr Fischer's elegant office in central Prague, which overlooks the opera house that staged the premiere of "Don Giovanni", is a far cry from the cubby-hole that he rented when he first returned. What drove his success, say observers, was a willingness to invest in quality for a long-term return. He also brought with him the Hanseatic business rectitude that he had learnt in Hamburg. Other operators thought nothing of putting their clients in hovels and skimming off a big margin; he made sure that his customers stayed in the same hotels as West Europeans. In 1995 he sold the German bit of his company to Lufthansa Condor, a subsidiary of the German airline, giving him enough capital to buy a small fleet of Boeing planes, another selling-point over rivals still flying oily Tupolevs.

The biggest moment in Mr Fischer's career came in 1997, when several thousand Czech holidaymakers were stranded in the Mediterranean after a devaluation of the Czech koruna had bankrupted several tour operators. Mr Fischer took a gamble and flew them all back at his own expense ($340,000, to be precise). This proved great publicity: most of those rescued became loyal Fischer clients.



A Fischer holiday is still beyond the pocket of ordinary Czechs. The average package goes for $500, well above the average monthly salary. All the same, Mr Fischer bullishly believes that the Czech market will quadruple to 2m packages by 2005. It helps that his compatriots are more interested in going abroad than other Central Europeans. "They're like Germans. They like travelling. They want sun, a tan and good meals," he says. Consumers in neighbouring Slovakia, for instance, are five times less likely to buy a package holiday than are Czechs, a difference not entirely explained away by Slovakia's poorer economy. The firm has higher hopes of Poland and Hungary.

Mr Fischer is eager that the Czech Republic should join the European Union, which it hopes to do in 2004. He reckons his low operating costs and central location—though what former Soviet satellite does not claim to be at the heart of Europe these days?—will give him an edge to push back into the crowded EU market, especially in neighbouring Germany and Austria. Membership will also do away with regulations that prevent his charter airline business from hauling passengers around within the EU.

Mr Fischer's popularity at home was confirmed in 1999, when he ran as an independent for the Czech Senate, the upper house of parliament. In a campaign that shamelessly advertised his company as much as Mr Fischer's own political credentials (a politely rendered distaste of the ruling politicians), he was elected with a record 71% of the vote; not bad for the first openly gay candidate in the country's history.

These days Mr Fischer leads a double life: the office in the morning, then a brisk stroll across the Charles Bridge to the Senate in the afternoon. He is talked of as a possible presidential successor to Mr Havel. That is unlikely, but not impossible: Mr Fischer's hopes have been boosted by some recent back-room deals that have left him looking less independent. He may yet be remembered more for his politics than his business acumen.

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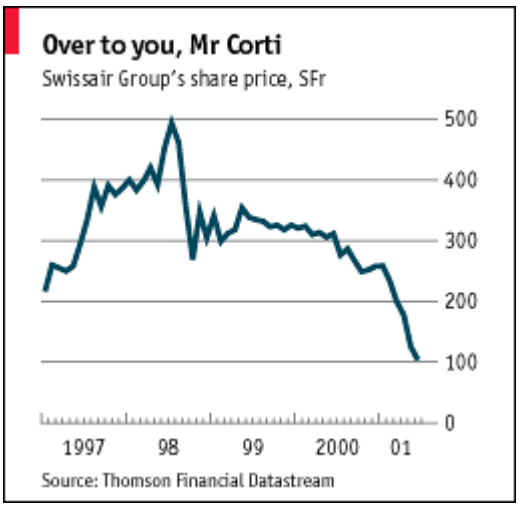
Swissair's woes

Not quite Nestlé

Jun 21st 2001 | PARIS
From The Economist print edition

Swissair's new boss is bouncing from one problem to another

PITY Mario Corti, boss since March of Swissair Group, Switzerland's flag-carrying airline and a world leader in related services such as catering and logistics. The former chief financial officer at Nestlé, a Swiss food giant, took over a group in grave strategic and financial difficulties. As expected of somebody who once circumnavigated the world in a light aircraft, he has been bold and decisive, securing a SFr1 billion ($561m) credit line to stabilise a balance sheet groaning under SFr6.3 billion of debt, making disposals and cutting costs. But it is as if he is swimming against the tide: no sooner has he overcome one problem than another pushes him back.



On June 15th, Swissair announced that AOM-Air Liberté, a loss-making French airline group in which it is a minority shareholder, had filed for bankruptcy. This ended a stand-off between Mr Corti and Marine-Wendel, a French family group that, despite being Air Liberté's majority shareholder, was refusing to inject one-third of the capital needed to keep the airline going. Marine-Wendel blames Swiss stubbornness for the bankruptcy. Almost everyone else blames Marine-Wendel.

On June 18th Mr Corti found himself at the centre of another storm when Sabena, Belgium's deeply troubled national airline, announced that efforts to produce a new business plan had stalled because its shareholders could not guarantee fresh money. Mr Corti's predecessor had foolishly bought a 49.5% stake in Sabena, despite the fact that the airline had made a profit only once in the past 40 years. Swissair may now be legally obliged to increase its stake to 85%, as part of a broader trade pact that is being discussed by the European Union and Switzerland.

Sorting out this mess will be the toughest test to date of Mr Corti's mettle. One the one hand, Swissair does not have the money to buy more Sabena shares, and understandably has no desire to fund its continuing losses because this would further undermine its own precarious finances. On the other, it cannot easily walk away because Belgian law forces shareholders to pay severance costs in the event of closure. In the case of bloated Sabena, these would be huge. Mr Corti's only hope might be to find a buyer for his own group that has deep enough pockets to extricate it from its Belgian nightmare. How far it must all seem from the ordered calm of executive life at Nestlé.

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GE / Honeywell

Welch squelched

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The largest industrial merger ever announced is all but dead

ADMITTING he was not too old to be surprised, Jack Welch, veteran chairman of General Electric and mastermind of its intended merger with Honeywell, stomped away from Brussels on June 14th, saying that the European Commission's conditions for allowing the deal were so tough that they would fatally undermine it. But should he have been surprised? There were plenty of signs in recent weeks that the $42 billion deal was in trouble.

Waved through briskly by American antitrust authorities last month, the merger met a far more sceptical reception in Brussels. On June 19th Jeffrey Immelt, Mr Welch's successor-in-waiting, told a French newspaper that its chances of success had faded to "nil". Although a few optimists think a deal is still possible, GE has gone far beyond mere posturing.

If not surprising, the outcome is nevertheless a bit puzzling. Mario Monti, the EU's competition chief, is an adept politician who has been unafraid to stand up to big companies—among them WorldCom/Sprint and Time Warner/EMI—but who has usually managed to broker compromises when it seemed sensible. In this case, however, he played an uneven hand.

More than once he allowed his officials radically to shift the ground for their objections, creating the unfortunate impression that EU antitrust policy was being made on the hoof. He also gave most weight to objections from commercially motivated competitors of GE and Honeywell, and listened less to customers. And in the end, he failed to appreciate that, when Mr Welch told him GE had made a final offer, he meant it. After leaving their meeting on June 14th, Mr Welch made remarks that killed any scope for further negotiation.

That prompted Mr Monti to issue a defensive statement in which he deplored outside criticisms and interference, and claimed that the two sides had not been so far apart. He sent a recommendation to block the deal to EU member governments the same day. Even though some are unhappy with the commission's planned veto, it is hard to envisage any other outcome. The commission will probably make its final announcement on July 2nd.

For its part, GE was slow initially to grasp that the commission would be a lot tougher than its American counterparts. Once it woke up, GE responded vigorously. In May it attacked a so-called "bundling" theory that until then had formed a main plank of the commission's objections. The theory held that GE could bundle sales of its aircraft engines and Honeywell's avionics into packages that would be priced to drive rivals out of business.

With its bundling theory under heavy (and largely successful) attack, the commission changed course. In early June it started to argue instead that a merged GE/Honeywell would simply be too influential in the aircraft-engines and systems businesses. Not only should it, therefore, be required to sell chunks of Honeywell's avionics business to competitors, but it should also modify the behaviour of GECAS, GE's powerful aircraft-leasing arm.

GE refused to contemplate any dilution of its full ownership of GECAS, a highly profitable business. GE also disagreed fundamentally with the commission's argument that GECAS, as one of the world's two leading aircraft-finance companies, wields a disproportionate influence on the market that would be strengthened by the addition of Honeywell. GE offered to give binding undertakings that GECAS would behave fairly. But the commission wanted a more radical solution: a partial spin-off.

Meanwhile, the commission demanded disposals of avionics businesses far bigger than GE had expected or was ready to concede. GE's initial offer to sell around $1 billion of avionics turnover was greeted with a demand four times bigger—and double Mr Welch's final offer of $2.2 billion. There was worse to come.

After demanding specific avionics disposals of $4 billion, the commission suddenly decided that much larger chunks should be carved out in order to create sturdy competitors. It increased its demand to $7 billion. Quite how this squares with Mr Monti's suggestion that a stronger commitment on GECAS alone might have been enough to salvage the merger, only he can explain.

A nagging question, even so, is why GE stuck so firmly to its position and reacted so fiercely and definitively in public when its talks with Mr Monti ended. One answer seems plausible. Since it decided to buy Honeywell last October, the economic outlook in America and elsewhere has worsened. That may not have been enough for GE to wish it had never put in its high-risk bid. But the altered climate seems to have made GE reluctant to take the greater downside risk that would result from a restrictive deal with Brussels. Although it has left Honeywell in the lurch, GE can now at least pin the blame for the failed deal on Mr Monti. Mr Welch may be old, but he is nobody's fool.

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High-speed Internet access

Broadband blues

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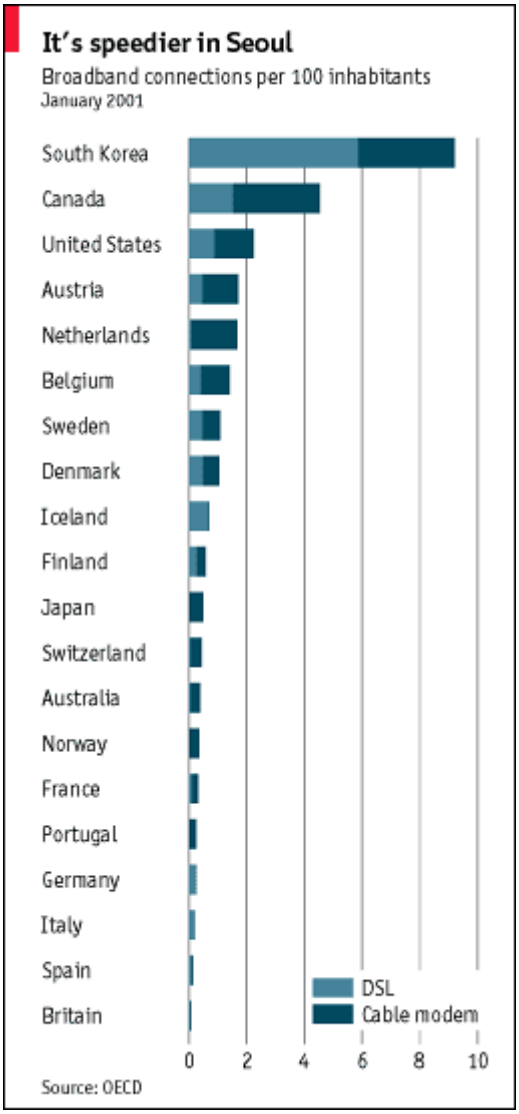
Why has broadband Internet access taken off in some countries but not in others?

Get article background

"THE future is already here—it's just unevenly distributed," a science-fiction writer, William Gibson, once joked. High-speed, or "broadband", connections to the Internet are a case in point. Although there is a widespread view that broadband is the future of the Internet, figures compiled by the OECD reveal an astonishing variation in the adoption of broadband across the rich world (see chart). South Korea leads the table with 9.2 broadband connections per 100 inhabitants, compared with 2.25 in America and a measly 0.08 in Britain, despite the popularity of the Internet in all three countries.

The irony is that, while the world's telecoms firms spend a fortune building third-generation mobile-phone networks, even though they are not sure that anybody wants them, in many parts of the world they seem unable or unwilling to provide broadband connections at reasonable prices, even though customers want them. Horror stories abound of long waiting lists, botched installations and deliberate foot-dragging by monopolistic incumbents. What is going on?



There is plenty of demand for broadband links, which come in two main types: digital subscriber-line (DSL) connections and cable-modem connections. DSL uses special hardware to turn old-fashioned telephone lines into high-speed data links; cable modems transmit data over the fibre-optic and coaxial cables used for television. Both technologies are capable of delivering data much faster than dial-up modems, and both offer the advantage of "always on" connections.

The problem lies in the supply. According to Merrill Lynch, an investment bank, Deutsche Telekom, Germany's telecoms incumbent, signed up 630,000 subscribers for DSL last year, but managed to connect only 135,000 of them. In Britain, it can take months to get a DSL connection, and cable modems are unavailable in all but a handful of areas. In America, independent DSL providers such as Covad and Rhythms are struggling; NorthPoint, another provider, went bust in March.

So why is broadband more readily available in South Korea and Canada than in other countries, even those with large numbers of Internet users? According to Sam Paltridge, at the OECD, several overlapping factors affect whether or not broadband takes off. The biggest is the degree of competition in the market, which governments have generally encouraged by allowing the construction of rival infrastructure to the telephone network, usually in the form of cable networks.

But the existence of rival infrastructure is not enough. Ford Cavallari of Adventis, a consultancy in Boston, points out that cable companies can make more money selling high-margin services, such as premium TV channels, to their subscribers than they can from offering cable modems. Meanwhile, the telephone network is usually in the hands of a state-owned (or formerly state-owned) monopoly that is reluctant to cannibalise corporate high-speed Internet access revenues by offering cheaper broadband. The result can be that nothing happens—as in Ireland, for example. In Scandinavia, says Mr Paltridge,

the cable infrastructure is often owned by incumbent telecoms firms. The resulting lack of competition may explain why no Scandinavian countries are in the top six for broadband penetration, despite having unusually high rates of Internet usage.

To get things moving, regulators in most OECD countries realised that it was necessary to “unbundle the local loop”—in plain English, to force incumbents to give other firms access to the copper wires running into homes. New entrants could then spring up to offer DSL over these wires, and so encourage the cable companies to compete by offering cable modems. Canada was one of the first OECD countries to unbundle its local loop; Britain was one of the last. This is one reason for the vast discrepancy in the availability of broadband between the two.

Yet unbundling is not sufficient to get broadband going either, since it is dependent on the co-operation of the telecoms incumbent. In both Britain and America, incumbents have hindered adoption of DSL by being deliberately unhelpful towards new entrants, many of which have given up or gone under. Regulators in America can impose only puny fines, which incumbents regard as a price worth paying to keep the market to themselves; Britain’s telecoms regulator, Oftel, has been criticised for failing to crack the whip over British Telecom.

Another problem is a shortage of technicians to install DSL connections. Some countries where the incumbent is keen on broadband, notably Belgium, have got round this through the use of “plug-and-play” equipment that subscribers can install themselves. This equipment is starting to become available in other countries, too, including France and Germany. In South Korea, the incumbent, Korea Telecom, took a different approach and trained an army of 2,500 technicians to install DSL. South Korea is a special case in other ways, too. Its population is highly concentrated, which made the construction of rival infrastructure cheap and easy. The result was fierce competition between cable and DSL providers: over 2m new DSL connections were installed during 2000 alone.

In short, the wide variation in the adoption of broadband is the result of several overlapping political, regulatory and technical factors. There is no simple way for governments to copy South Korea, much as they would like to. All they can do is to unbundle the local loop and keep a close regulatory eye on the behaviour of their telecoms incumbents, which can drive or delay the adoption of broadband pretty much as they choose. And in Europe, says Mr Paltridge, there is evidence that the old guard is finally yielding to change. The OECD’s latest figures show that, in the first quarter of 2001, the number of DSL lines grew by 73% in France, 90% in Britain and 113% in Germany. The signs now point to a surge in growth—even if it is not on the scale of South Korea last year. Could it be lift-off at last?

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Airbus

Place your bets

Jun 21st 2001 | PARIS AND TOULOUSE
From The Economist print edition

Big passenger jets are better than fast ones. Or is it the other way round?

Get article background

AP

French fans

AS NOËL FORGEARD speaks, a big white aircraft performs lazy circles overhead. The boss of Airbus is describing his achievements since taking the controls three years ago, as his latest product describes tight arcs in rehearsal for the Paris Air Show, which opened on June 16th. The aeroplane is the A340-600, which flew for the first time in late April. It is the longest aircraft in the world, yet it glides around quietly with only the occasional blast from its four engines—a stunt Airbus loves to pull to show how silent its jets are compared with the competition from arch-rival Boeing.

The new A340 will carry around 380 passengers, as many as all but the most modern Boeing 747s. Its low-key, low-noise flight is in keeping with the profile of Mr Forgeard, whose previous job was as president of France's Lagardère aerospace and defence group. When he took over at Airbus, his main job was to drag a consortium born of industrial policy and taxpayers' subsidies into a world of commercial reality. He saw the challenge as threefold: to match Boeing's market share; to launch Airbus's A380 super-jumbo project; and to oversee the conversion of Airbus from a financially nebulous consortium into a real business.

Airbus has clawed its way to a position in which it now broadly matches Boeing in terms of orders. Boeing makes much of the fact that it still delivers two-thirds of all jetliners sold (ie, those with 100 seats or more; below that there are other contenders, such as Brazil's Embraer and Canada's Bombardier). But Airbus's superiority in new orders is about to translate into the hard cash of deliveries: its order backlog of 1,659 is now bigger than Boeing's, according to analysts at J.P. Morgan, an investment bank. At the Paris show, it paraded a long list of new deals, one of them a single, $8.7 billion order for 111 aircraft (including ten super-jumbos) from ILFC, a leasing company owned by AIG, an American insurance company.

Both Boeing and Airbus foresee a 30% fall in jet orders this year, as airline profits decline. But both are confident that it will be a soft landing rather than a crash of the sort the industry experienced during the recession ten years ago. Airbus expects to emerge from the Paris show with far more than half the total orders placed. This week, Boeing duly denounced Airbus's tactic of stacking up orders so that they can be announced in one lump at high-profile events as "fluff".

Mr Forgeard's second challenge, to launch the super-jumbo, has been the most daunting. Since the introduction of the 747 in 1969, Boeing has enjoyed a monopoly in aircraft carrying over 350 passengers. The A340-600 will be the challenger until the 550-seater super-jumbo enters service in 2006.

Before the Paris Air Show, the super-jumbo had won 62 firm orders, plus 40-odd options. Mr Forgeard is confident of reaching 100 firm orders by the end of the year. Airbus needs around 250 orders before it begins to make a profit on the project. Its chances have been greatly increased by Boeing's failure to win any orders for a revamped 747. Rather than compete with the super-jumbo, Boeing has decided to concentrate on a smaller, faster "sonic cruiser". So the petty sniping of old has been replaced by a genuine battle of philosophies: on one side is size, on the other speed.

Turning Airbus into a company has brought some unexpected changes. It is now 80% owned by EADS, a Franco-German-Spanish group, and 20% by Britain's BAE Systems. All management meetings are held in English, according to Mr Forgeard, even if all the participants are French. "It is embedded in our way of thinking," says Mr Forgeard. He hopes this will translate into an Anglo-Saxon enthusiasm for the bottom

line.

As a consortium, Airbus never knew what its real costs were, since consortium members were also its biggest suppliers. Now it hopes to drive down working capital by up to 15% by functioning as a properly transparent company. It is also forcing suppliers to cut prices. Instead of four partners having contracts with, for instance, aluminium makers, there is a single Airbus contract—and the price has to match the best terms of any previous deals. Airbus is hoping that this will lead to a net profit margin of 10% by 2004, up from around 8% today, as aircraft production rises and economies of scale begin to take effect. Already, pre-tax profits are running at around *euro*1.5 billion ($1.3 billion).

The biggest obstacle to raising them would be wholesale cancellation of order options, if airlines panic as profits fall in the downturn. Last month, air travel declined year-on-year for the first time in ten years. If that trend continues, Airbus could yet be in for a bumpy ride.

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Argentina

The last tango?

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Argentina's latest economic reforms have rattled markets in South America

Get article background

INTRODUCED in 1991, Argentina's currency-board system, under which the local peso is tied to the dollar at par, has been seen as the lifebelt that has kept the economy afloat. The hyperinflation of the 1980s was banished, to be replaced by a burst of growth. But in recent years, as the dollar—and so the peso—have surged against the euro, the yen and neighbouring Brazil's *real*, Argentine exports have struggled to compete. And the lifebelt has seemed more like a millstone.

The obvious solution, a devaluation, is a non-starter. Less than a tenth of the government's debt is denominated in pesos, so devaluation would bring financial ruin to it as well as to private-sector borrowers. A big refinancing early this month of $29 billion-worth of commercial debt, through a swap for longer-dated bonds, bought a respite. But the shadow of a potentially catastrophic default still hangs over Argentina.

So on June 15th Domingo Cavallo, the economy minister, who in an earlier incarnation in the job was the main designer of the currency board, tried a new tack. He announced a package of reforms, including a system of subsidies for exports and tariffs for imports, which will have the effect of introducing a floating exchange rate for foreign trade. Exporters will be able to claim a reimbursement when they convert their dollar receipts into pesos, equal to the average of the peso-dollar and peso-euro exchange rates. This week, an exporter would have received more than seven extra pesos for every $100. The same rate will apply in reverse for imports, which become more expensive.

Mr Cavallo insists the convertibility system is unaffected, since the refunds and tariffs are fiscal measures handled by the customs authorities, and not a parallel exchange rate administered by the central bank. But foreign investors were unconvinced by this sleight of hand. Concern that this was a first step towards full-scale devaluation sent the price of Argentina's bonds tumbling. Yields leapt to a margin of more than ten percentage points above American Treasury bonds. Nervousness affected stockmarkets not just in Argentina, but in other South American countries too. In Brazil, the *real* fell to a record low against the dollar—prompting the central bank to raise interest rates sharply.

Mr Cavallo, brought back as economy minister only in March, announced in April a plan to amend the convertibility system by pegging the peso to a currency basket, consisting in equal parts of dollars and euros. But, he says, the change will not take effect until the euro reaches parity with the dollar (if that ever happens), when the export subsidy will disappear.

Mr Cavallo's latest approach is unorthodox. Neither export subsidies nor tariffs are high on the list of approved measures at the World Bank, the International Monetary Fund or the American Treasury. Other moves include increases in employers' payroll contributions, and income-tax cuts. Analysts were unhappy that Mr Cavallo had offered no spending cuts, although most accept that they would be politically impossible at the moment.

Local hero

The measures have played better at home than they have abroad. Norberto Sosa, of Raymond James, an investment bank, praises them as an unusual but pragmatic mixture of aid to exporters and stimulus to

the domestic economy. As capital inflows to emerging markets dry up, Argentina needs to boost exports to raise foreign-currency revenue.

The international audience is both baffled and irritated by Mr Cavallo's hyperactivity. On the other hand, says Arturo Porzecanski, of ABN Amro, a bank, if Mr Cavallo can increase domestic confidence, foreign confidence should follow. In the meantime, he has "basically written off" the foreigners, reckoning that they will give him no credit for the economy until it is unequivocally out of its rut.

Indeed, closer inspection of the latest package suggests that it is chiefly a headline-grabbing attempt to raise local spirits after three years of recession. Mr Cavallo has announced plans to pump as much as $5 billion into the economy, by issuing bonds secured against overdue tax receipts. Elsewhere, much of what he promises to deliver with one hand he is slyly taking away with the other.

In return for the new exchange-rate rules, for instance, he has reduced both direct export subsidies and external tariffs. Similarly, the trumpeted income-tax cuts are modest in scope and will in any case be partly offset by the higher prices of imports and by new taxes, for example, on fuel and transport.

For all its promised stimulative effects, Mr Cavallo reckons the package will raise $620m in revenues for the government, helping it meet a target for the fiscal deficit that was looking increasingly out of reach. "When you strip down the measures, there ain't much there," says Mr Porzecanski. "But he is certainly making the biggest fuss ever." It is a risky strategy. It relies on persuading Argentines that he has done more than he has in fact delivered, while at the same time persuading jittery international markets that there is less to his reforms than meets the eye.

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Money laundering

Fighting the dirt

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Governments claim progress in the war against money laundering

Get article background

LEGEND has it that Al Capone used a string of coin-operated launderettes in Chicago to disguise his revenues from gambling, prostitution and protection rackets. Since then, money laundering has grown rapidly. Some $500 billion-1.5 trillion a year (equivalent to 1.5-4.5% of gross world product) generated by illegal activities is washed through the banking system, according to estimates by the International Monetary Fund. Until recently, governments talked tough about the problem, but did little about it. All that changed two years ago, with the birth of a campaign that celebrated a triumph of sorts this week in Paris.

When it first appeared in 1989, the Financial Action Task Force on Money Laundering (FATF) was conceived by the G7 countries as a helpful, co-operative sort of organisation. It would persuade governments to combat money laundering, and offer them technical assistance to do so. Then, a year ago, it ran out of patience and slapped 15 countries on to a money-laundering blacklist. This week, in a mood of self-congratulation about the impact of this blacklist, the task-force has been pondering whom to add and remove. Persistent offenders may face “counter-measures”, which at worst could mean that banks in the FATF’s 29 member countries would be barred from dealings with banks based in a named location.

The FATF’s strong-arm approach has had an impact, at least on legislators. Fear of being ostracised from the world’s financial system has prodded most of the 15 governments into a flurry of law-making. The Bahamas has enacted 11 pieces of new money-laundering legislation in seven months. Liechtenstein has not only overhauled its laws, but also set up an institute, staffed by people from KPMG, an accountancy firm, to educate the territory’s financiers about fighting money laundering. The Cayman Islands and Panama have also received nods of encouragement from the FATF for their law-making efforts. All four countries are favourites to be removed from the blacklist. But the FATF is likely to add six more in their place, including Hungary, Indonesia and Egypt.

Evidence of the FATF’s clout: on the day of Liechtenstein’s blacklisting, Standard & Poor’s, a rating agency, changed the outlook of the principality’s biggest bank, LGT Bank in Liechtenstein, from stable to negative. It said that it was worried about the impact that counter-measures might have on the bank’s business. This week, the agency praised Liechtenstein for its good works, perhaps prematurely, and raised its outlook again.

That is the good news. Less happily, Russia, the FATF’s chief enemy, drags its feet. The Duma has yet to pass a money-laundering bill. The Philippines has not produced one, although its central bank has issued a new set of guidelines for the banks. One country, of all those named and shamed by the FATF, has done nothing at all: Nauru, in the South Pacific. Presumably it is by now a holiday destination for Russians and tax accountants.

Even where laws have been passed, it is not clear that money laundering will be beaten. Laws need to be enforced, and whether they are or not is often hard to gauge. The laws typically require a bank to “know the customer”, to be confident that his money is obtained by legitimate means, and to report any suspicious activity. This involves a vast effort, thanks in part to the growth of “correspondent banking” relationships—banks with accounts at other banks, which they make available to their customers. In effect, this means that banks must know their customers’ customers.

Not just on coral atolls

A lot of effort cannot guarantee to put a stop to money laundering—even in America, as a recent report by Senator Carl Levin made clear. It would be no surprise if some legislators in offshore jurisdictions felt that they should make a show of cracking down on money laundering, without in fact doing much to scare off valuable customers. This is clearly something that bothered the FATF as it considered taking countries off the blacklist.

Denouncing the practices of 15 countries, many of them small and developing, has also drawn attention to the gentler treatment that the FATF affords its own members. Some do not fulfil all the criteria contained in the FATF's "40 recommendations", which set out what it thinks member countries should do about money laundering. Mexico, a recent member, does not fully obey three of the rules, the FATF says in its most recent annual report, and Argentina is described as "a basic model in transition." Enforcement is also a concern with some member states. Brazil, the FATF points out, has failed to bring any successful prosecutions.

The FATF even has doubts about America, where "know your customer" laws were blocked last year because of concerns about privacy. However, "voluntary" guidelines have sent the banks into a frenzy of activity that ought to allay the FATF's concerns, at least for now. Still, there is a battle within America's Treasury Department, where some staffers would like to scrap the requirement that banks must report suspicious activity and to raise, from $10,000 to $25,000, the financial transfers that have to be reported to the authorities. Paul O'Neill, the treasury secretary, has worried international regulators by seeming to favour offshore tax havens, even if he does not favour their money-laundering activities.

This raises the toughest question: what exactly are efforts against money laundering trying to achieve? So far, countries have been free to define what they regard as illegal sources of money. All include drugs, racketeering and other dark crimes in their definition. Some, such as France, consider tax evasion to be money laundering; others, like Switzerland, do not.

In future, the task-force may lay down a consistent definition of money laundering, and some of its members want this to include tax evasion. Some suspect that the OECD would like to use the fight against money laundering to advance its parallel and controversial campaign against an activity it calls "unfair" tax competition, because low rates in one place encourage tax evasion in another.

If the FATF sides further with the fight against tax havens—it has its headquarters at the OECD, after all, and meets regularly with the OECD committee leading the tax-haven charge—it risks losing support for dealing with nastier crimes. "We are aware that focusing on tax evasion could undermine the effectiveness of anti-money-laundering systems," says Patrick Moulette, head of the task-force secretariat. Not, probably, a price worth paying.

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Auditing

Andersen's fairy tales

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A $7m fine from the SEC again raises doubts about the independence of auditors

THIS week the Securities and Exchange Commission (SEC) brought its first successful action for fraud against an auditor in more than 20 years. It fined Andersen (né Arthur Andersen) $7m for "improper professional conduct" when auditing the accounts of Waste Management in the early 1990s. The rubbish collector's unqualified accounts for the years 1992-96 were subsequently found to have overstated pre-tax income by more than $1.4 billion. Without admitting or denying the allegations, Andersen has agreed to pay what is the biggest-ever penalty imposed by the SEC on a leading firm of accountants.

The case underscores the SEC's concern that the quality of auditing is being compromised by the amount of (more lucrative) non-audit work that companies' auditors now perform for their clients. Andersen's relationship with Waste Management was both long and broad. The company's accounts have been audited by Andersen for over 30 years and, until 1997, every chief financial officer in Waste Management's recent history had previously worked as an auditor for Andersen.

In the early 1990s, the Andersen partner in charge of Waste Management's audit was Robert Allgyer. He was also "marketing director" for Andersen's Chicago office, in charge of cross-selling other services to audit clients—a job he was good at. Between 1991 and 1997, Waste Management paid Andersen $7.5m in audit fees and $11.8m in other fees. This week, the SEC fined Mr Allgyer $50,000 and banned him from auditing public companies for five years.

Last year the SEC backed away from a proposal to ban auditors of public companies from, in particular, offering IT services to their audit clients. In a compromise, it forced quoted companies to begin stating how much they pay their auditors for auditing and how much for other things. Interesting reading. Last year, for example, General Electric paid KPMG $23.9m for auditing its books and $79.7m for other services; General Motors paid Deloitte & Touche $17m for its audit, $79m for other things.

Waste Management paid the highest audit fee ($48m) of any public company in America last year, to clean up the garbage from previous accounts. And its auditor in 2000 was none other than Andersen, which picked up another $31m from Waste Management in consultancy fees.

The SEC's incoming chairman, Harvey Pitt, a Washington securities lawyer, wrote in 1998 that the "performance of non-audit services can improve the audit function." After the Andersen case, does he still believe that?

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Economics focus

Saved!

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Are the finances of American consumers in better shape than people fear?

IS IT a bird? Is it a plane? It is not even Superman who has, so far, saved the world's largest economy from sinking into deep recession, rather than merely slowing down. The hero has been the American consumer, who has carried on spending—albeit at a slowing rate of growth—in defiance of many predictions.

Most forecasters expected worse because of a sharp decline in America's "savings ratio", which measures savings as a percentage of personal income. The ratio, calculated from national accounts data, turned negative last year and is now -1.3%, suggesting that people are spending more than their after-tax income. In the 1970s and 1980s the savings ratio averaged over 9%. It has turned negative only once before, during the Great Depression.

Economists feared that consumers believed that share prices would go on rising for ever, and that capital gains on shares were making saving unnecessary. As share prices tumbled, by this reasoning, consumers would sharply increase their saving—reducing consumption and so wreaking havoc on the economy. Yet in practice, the negative "wealth effect" of falling shares has been remarkably muted, at least until now.

Some new studies suggest why that might be. Martin Barnes, of the *Bank Credit Analyst*, a newsletter, argues that the savings ratio is flawed and its fall an illusion. Measured correctly, he says, saving has been strong in recent years. As it is now calculated, the ratio takes into account taxes paid by individuals when they realise a capital gain from selling shares, but ignores the increase in income when the capital gain is banked. This could be corrected by adding back the tax, which would have increased the savings rate by 1.8 percentage points last year, pushing it into positive territory. Or it could include realised capital gains in full, amounting to fully 6.7% of personal income last year.

Pension-fund benefits are not treated as income, either. But contributions to personal pensions by employers are. Thanks to the stockmarket boom, many firms have been able to take a "pension holiday". The addition to the income side of the savings ratio thus seemed lower, at a time when pension benefits (the money consumers actually had to spend) were rising strongly. Adjusting for this would have added three percentage points to the savings ratio last year.

Mr Barnes also argues that spending on consumer durables, such as cars, should be treated largely as investment, not consumption. For accounting purposes, their cost should be spread over several years, just as the cost of a company's new machinery is depreciated over time. Consumer spending would have been $233 billion lower in 2000 had durable purchases been depreciated over ten years. That adds 3.3 percentage points to the savings ratio. All told, the ratio may have been as high as 13.9% last year (if capital gains are included), or 7.8% (if only gains tax is added back), compared with an average in the 1990s, similarly adjusted, of 12.7% and 9.9% respectively.

A new study by the Federal Reserve takes another tack*. Analysing financial flows data (the financial counterpart of the national accounts) and the Fed's survey of consumer finances, it found that between 1992 and 2000, the savings ratio of the richest fifth of households, which owned four-fifths of shares held directly by individuals, had dropped from 8.5% to -2.1%. But households in the middle fifth of the income distribution slightly increased their savings ratio, and those in the poorest two-fifths almost doubled theirs, to over 7%.

In short, many of the worst-off consumers actually improved their finances during the 1990s. Only the richest fifth slashed their saving, though even this may be overstated: the Fed study does not include realised capital gains in its savings ratio. This suggests that any fall in share prices may affect only the consumption of the rich. The bulk of Americans own few shares, and thus have little sensitivity to stockmarket changes.

Indeed, so far, there seems to have been little impact on consumption from the $3.4 trillion decline in household wealth, over the year to March 2000, that was caused by the fall in share prices. An argument rages inside the Federal Reserve about whether this is because the wealth effect happens only gradually†, or is minimal in the first place‡.

Certainly, the rich can afford to react more slowly than the rest of the population to declines in wealth. A survey of “high net worth” families published this week by US Trust, a private bank, found that many are hopeful that share prices will rise steadily later this year, and perform well thereafter, suggesting little need to tighten purse strings. Even in a prolonged bear market, barely half would be at least “somewhat likely” to postpone capital improvements to their homes, or stop buying things like furniture, electronics and expensive clothing. Barely one-quarter said they would be somewhat likely to cut everyday expenses.

A bigger threat to consumption than lacklustre shares may be unemployment, which now seems to be rising. Even if consumers have been ignoring the need to save during the good times, they still have something put aside for a rainy day. And that may yet save the economy from catching a really bad cold.

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* “Disentangling the Wealth Effect: A Cohort Analysis of Household Saving in the 1990s”, by Dean Maki and Michael Palumbo. Federal Reserve, April 2001.

† “A Primer on the Economics and Time Series Econometrics of Wealth Effects”, by Morris Davis and Michael Palumbo. Federal Reserve, January 2001.

‡ “A Primer on the Economics and Time Series Econometrics of Wealth Effects: a Comment”, by Martin Lettau, Sydney Ludvigson, and Nathan Barczi. Federal Reserve Bank of New York, May 2001.

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Investment banking in Italy

Mediobanca on the back foot

Jun 21st 2001
From The Economist print edition

The unremitting rise of international investment banks in Italy

ASK N.M. Rothschild which investment bank headed the rankings for mergers and acquisitions in Italy last year, and it produces a table to show that, as it happens, Rothschild did. Put the question to Morgan Stanley, and this investment bank has figures to back its claim to the top slot. Whatever the spin, though, one thing is clear: international investment banks, and not the Italian banking aristocracy, now dominate business in Italy.

Italy's leading domestic investment bank, Mediobanca, was an also-ran in last year's M&A tables, ranked number six according to Morgan Stanley and tenth on Rothschild's reckoning. Further confirmation of Mediobanca's decline came with the news earlier this month that UBS Warburg, a Swiss bank, would be joint global co-ordinator, with Deutsche Bank, of the flotation of Campari, a drinks firm, and (with Mediobanca's main domestic competitor, Sanpaolo IMI) of the flotation of the gas-grid subsidiary of ENI, a partly privatised energy concern.

Only a decade ago, Mediobanca seemed unbeatable. It sat at the centre of a web of influence, thanks to its stakes in blue-chip Italian financial and industrial groups, and to its own well-connected shareholders (including some of those groups). This small and secretive Milanese bank was the pre-eminent power in Italian finance.

How did the outsiders break in? According to Paolo Zannoni, managing director of Goldman Sachs in Italy, privatisations opened the door during the 1990s. After his bank had kicked off Italy's public-sector asset sales, by managing an offering of shares in Credito Italiano, a big retail bank, at the end of 1993, there was a steady flow of share offerings and trade sales, as public-sector concerns were wholly or partly privatised. Between 1993 and 2000, Italian privatisations raised around 200 trillion lire ($89 billion), generating fat fees for the investment banks.

When Italians started talking about privatisation, many thought Mediobanca would win hands down. Instead, what seemed to be Mediobanca's strengths were, in fact, its weaknesses. The bank was handicapped by suspicions that it and its friends in Milan's *salotto buono* (literally, good drawing-room) would profit at the expense of the state. While Mediobanca got some work, the international banks, with their experience in privatisations in other countries, were the main beneficiaries when the treasury ministry doled out the mandates.

Even before privatisations got under way, the international banks had set up in Italy. Goldman Sachs, a late arrival in 1994, still occupies the same modest offices in a shabby alley in the centre of Milan, as if it never really intended to stay.

All the international banks have stayed, though, and they have built on early relationships, offering new services and products. Their worldwide reach gives them an edge in cross-border mergers and acquisitions. But the international banks are ahead in domestic transactions as well. Credit Suisse First Boston (CSFB) advised Telecom Italia in its defence against a hostile bid from Olivetti, and jointly, with Morgan Stanley, it advised a large insurer, INA, when Assicurazioni Generali made a hostile bid. Last year, Rothschild advised Banca Nazionale del Lavoro (BNL) on the sale of its stake in Banco di Napoli, and it is now giving BNL defence and strategy advice. UBS Warburg and Morgan Stanley advised the different parties in the merger of Banca Lombarda and Banca Regionale Europea in 1999.

The international banks have established their dominance in issuing debt and equity, and they have strengthened their sales and trading operations in Milan. Andrea Morante, chairman of CSFB Italy, says that the bank's derivatives business in Italy has been a particular success; now asset management is taking off, thanks to an abundance of affluent Italians and new, non-profit foundations, and to the growth of private pension funds. Goldman Sachs and Morgan Stanley are both breaking into property

securitisation. The banks no longer have a cultural gap to bridge, says John Andrew, a director at Schroder Salomon Smith Barney in Milan: the new generation of Italian businessmen and bankers are cosmopolitan, often educated at the top international schools, and are as much at home on Wall Street as in Milan.

In contrast to the international banks, which can draw on staff from London or New York to work on a deal, Mediobanca remains small (with a total payroll of just 320, of which three-fifths are clerical) and parochial. Since the death a year ago this week of Enrico Cuccia, the bank's founder who pulled the strings to the very end, Mediobanca's management has been accident-prone. This year it has, variously, let down one long-standing member of the *salotto buono*, managed to offend the Bank of Italy and failed to anticipate or see off a stockmarket raid on Montedison, an industrial and energy group in which it was the biggest shareholder.

In the speculation about Mediobanca's future, talk of a break-up or a takeover now plays a part. When the bank closes its annual accounts at the end of June, the figures will show that it depends too much on lending operations, rather than investment-banking fees, for its income. What makes Mediobanca interesting, on the other hand, are its corporate shareholdings, which include a 10% stake in Assicurazioni Generali, about to be increased to 14%, as well as big stakes in Fiat and Pirelli. Some bankers believe that Mediobanca's end (in its present form) will come, sooner rather than later, when its main shareholders fight over these crown jewels. Others point to Mediobanca's resilience.

Without its investment portfolio, which brings captive business, Mediobanca's investment-banking business would be even smaller than it is, which is one argument against an imminent break-up. Another is the recent arrival in the controlling shareholder group of Mediolanum, a financial-services firm in which Silvio Berlusconi, Italy's new prime minister, has a 36% stake. It is unlikely that, so soon after joining the club, Mediolanum would want it dissolved. More likely, Mediobanca will stagger on until shareholders agree a strategy. International investment banks will not mind the staggering.

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Japan's post office

Reformable?

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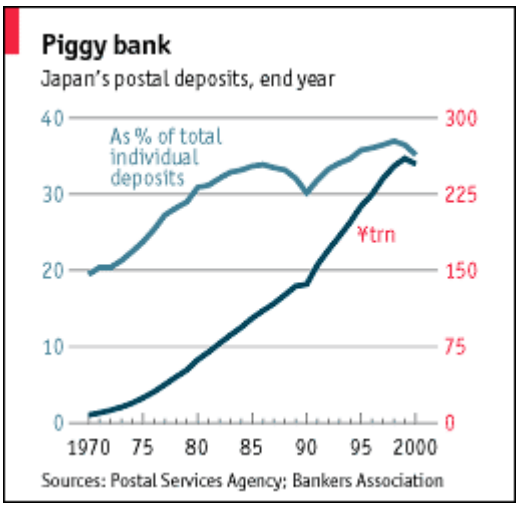
There is talk of reining in Japan's largest and most powerful financial institution

EVER since his days as a young, wide-eyed politician, Junichiro Koizumi has wanted to privatise Japan's powerful post office. He came closer to his goal when he was elected prime minister in April. One of his first acts was to set up an advisory panel, stuffed with pro-reformers, to look at post-office reform. The panel, which met for the first time this month, is already demanding that the government-run postal savings system disclose all sorts of figures, including the true extent of its unrealised profits and losses.



Yet change will not be easy. With ¥255 trillion ($2.1 trillion) of deposits, Japan's postal savings system is the biggest financial institution in the world. When prodded, it flexes political muscle through its huge branch network, whose employees are staunch supporters of the ruling Liberal Democratic Party.

To be fair, the post office has been reformed a little in recent years. Its funds, which traditionally provided the government with a "shadow" budget, no longer fill the coffers of the finance ministry. In 2003, the post office will be turned into an "independent" public company. Afterwards, if Mr Koizumi gets his way, it might even be privatised. This would represent "the most significant and difficult structural change in Japanese finance" since the second world war, argues Thomas Cargill, professor of economics at the University of Nevada, and Naoyuki Yoshino, professor of economics at Keio University in Tokyo, in a recent paper on the postal savings system.

Further post-office reform could boost Japan's ailing financial system in several ways. Postal savings accounts make up 35% of all household deposits, nearly as much as all deposits in commercial banks put together. The postal insurance business has ¥117 trillion in policies, and controls more than a third of the country's life-insurance market. Traditionally, the government has been able to pour much of this money into its own programmes, such as state-housing loans or inefficient public-works projects. It has invested most of the remainder in government bonds. Critics argue that this has prevented money from flowing into higher-yielding assets, such as equities or venture start-ups, in a way that would help the economy to grow.

Competitors of the post office also want to be able to compete on even terms. For years, bankers have resented the perks that the postal savings system enjoys. It pays no taxes. Its deposits are guaranteed by the government, an attraction to depositors worried about the state of the banking system. For now, the banks also have a government-guaranteed safety net. But this will be withdrawn next April. Meanwhile, banks pay a premium for deposit insurance, while the post office gets it free.

Without having to worry about profitability, the post office has come up with products that private-sector rivals cannot hope to match: more flexible deposit accounts with higher rates of interest, for instance. Life-insurance companies have also suffered. They argue that the post office started to raise rates of return on its policies in the 1980s, forcing the insurers to follow suit. The burden of these high payouts has already led several life insurers to go bust, and has left the rest greatly weakened.

The post office has also been able to cross-sell its three main products (postal services, savings and insurance), unlike banks and insurance companies, which are prohibited from entering each other's businesses. It enjoys greater freedom from inspectors and regulators, since, as a government agency, it does not fall under the thumb of the Financial Services Agency. What is more, the post office has no external auditors to check its accounts. Rather, these are examined by bureaucrats in the Ministry of Public Management, Home Affairs, Posts and Telecommunications (MPHPT), to which the postal savings

agency also happens to belong.

Banks and insurers have long argued that the post office was never meant to compete with the private sector. It was set up in 1875 to offer small-lot deposits and insurance policies that were not offered by banks or insurers at the time. Now, nearly half of the retail banks' deposits are defined as small, as are nearly three-quarters of life-insurance policies. Although the 24,700 post offices across the country do indeed serve people in areas where there are no banks, Mr Cargill suggests that the post office could rent out these facilities to retail banks, so earning a fee-based income.

Whether any of these mooted changes will happen in 2003 is unclear. The signs are not promising. Bankers are worried that reforms could end up sharpening the post office's competitive edge, by letting it participate in areas from which it is currently excluded. Meanwhile, the MPHPT insists on drawing up the reform legislation behind closed doors. Banks and insurers have repeatedly asked to take part in the process, but so far the ministry has not let them.

For now, reformers hope that Mr Koizumi will ensure that the postal savings system will eventually be deregulated. But with so many interests dug in, the prime minister and his supporters face a huge battle to dismantle the most powerful financial institution in the country.

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World economy

Stagflation?

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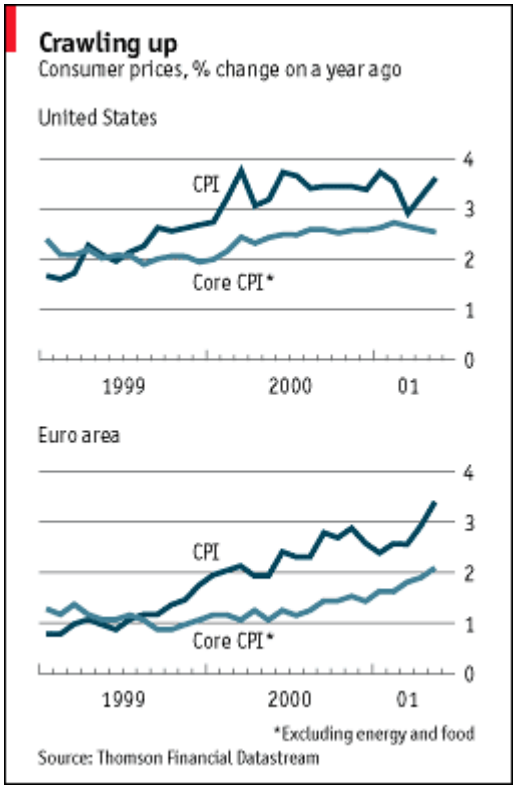
As growth slumps, inflation jumps

WHILE everybody's attention has been on a slowing world economy, an unwelcome guest has crept in. Inflation in the G7 economies rose to an average of 2.8% in May, up from 1% in early 1999 and the highest for almost eight years.

Inflation has edged up to 3.6% in America, from 1.6% in early 1999; and to 3.4%, from 0.8%, in the euro area. A big part of this increase reflects higher energy prices; core inflation rates have risen by less (see chart). The jump in inflation comes with more evidence of a sharp economic slowdown. In the five months to May, America's industrial production fell at an annual rate of almost 7%. Industrial output in the euro area fell in both March and April.

Falling output and rising inflation has spurred talk of a return to stagflation, 1970s-style. That would present a serious dilemma for central banks, especially the Federal Reserve and the European Central Bank (ECB). If they cut interest rates to prevent recession, inflation might rise further; if they raised interest rates to stem inflation, growth would slow.



Yet stagflation is far too strong a word. Inflation is still low by the standards of the past 30 years. Forecasts suggest that inflation in America and Europe is likely to drop over the next year. The recent jump in inflation in the euro area, to well above the ECB's 2% inflation target, was one reason why the bank held interest rates unchanged at its meeting on June 21st. To cut rates too fast would dent its credibility. However, most analysts reckon that inflation will drop sharply in June, opening the way for a rate cut this summer.

America's Federal Reserve next meets on June 26th-27th to set interest rates. Fears that the Fed's easing so far this year could fuel inflation have driven up bond yields. But Alan Greenspan, the Fed's chairman, is adamant: "Inflation is not a significant problem at the moment."

One clear concern in America is the sharp jump in the rate of increase in unit labour costs, to an annual figure of 6.3% in the first quarter, compared with a fall of 1.9% in the same period of 2000. This mainly reflects the plunge in productivity growth. However, in the current weak economic climate, firms with lots of spare capacity find it hard to pass on costs, so rising labour costs are more likely to squeeze profits than to push up inflation.

Most economists expect the Fed to cut interest rates again next week, but they are split on whether it will by another half-point or by just a quarter. A quick glance at three of Mr Greenspan's favourite economic indicators suggests that he may favour another half-point cut.

The first is the personal consumer expenditure (PCE) deflator, which he believes is a better measure of inflation than the consumer-price index. This has risen by only 2.2% in the year to April.

The second is the income measure of GDP. The most commonly quoted GDP figures, based on the expenditure of consumers, companies and the government, show that real GDP grew at an annual rate of 1.2% in the fourth quarter of 2000 and the first quarter of this year. However, Mr Greenspan has said in

the past that an alternative “income” measure of economic activity that adds up labour income, profits and net interest payments may be more reliable.

In theory, expenditure and income measures should be identical: one person’s spending is another person’s income. In practice, they diverge because of statistical errors. Jan Hatzius, at Goldman Sachs, notes that the income measure of GDP has risen by just 0.2% at an annual rate over the past two quarters. So the economy may have slowed more sharply than the official GDP data suggest.

A third measure which Mr Greenspan is thought to watch closely is weekly initial jobless claims, a measure of labour-market conditions. These claims have risen at an annual rate of 50% over the past six months—the sort of sharp increase that has never been experienced before except during periods of recession. The rate of increase has accelerated sharply over the past two months. Three reasons to put your money on a sixth half-point cut.

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Quantum cryptography

The end of the code war?

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The use of quantum mechanics to encrypt messages may foil eavesdroppers and code-breakers for good

"AT THE speed of light, Hephaestus's sacred fire/ Blazed from beacon tower to beacon tower." Thus, according to Aeschylus, spake Clytemnestra, an ancient queen of Mycenae, explaining how she received tidings that her husband Agamemnon was on his way home from the Trojan war. Perhaps Agamemnon would have done better to have turned up unannounced. The news left the queen and her lover just enough time to plot the cuckold's assassination.

When Agamemnon sent the message, though, he probably worried less about betrayal than interception. Using signal fires or flashes of sunlight reflected from a mirror was (and is) a cheap and simple way to broadcast information. But although such signals were used until the early 20th century to co-ordinate military manoeuvres, they are vulnerable to espionage: a clever onlooker can easily observe the flashes of light and crack the message, even if it is encoded.

It may seem surprising, therefore, that some physicists at Los Alamos National Laboratories in New Mexico believe that they can transmit messages through the open air in complete secrecy, by exploiting the quantum-mechanical properties of light. Last week, at the International Conference on Quantum Information, in Rochester, New York, they explained how to build a system that will broadcast uncrackable messages via satellite.

All keyed up

Modern cryptography, such as that employed in a widely used program, Pretty Good Privacy (PGP), relies on the mathematical manipulation of data. To encrypt, or "lock", a message, the program performs a series of mathematical steps on it, using a number more than a hundred digits long. Only that number's correct mate, or "key", is able to undo these steps and unpack the message.

The size of these numbers, and the mathematical formula that links them, make it, in effect, impossible to work out the key by computational brute force. One of today's keys could not be calculated even if all of today's computers worked for the lifespan of the universe on the task. Surely that is safety enough?

Perhaps not (that is why the software is called "pretty good" and not "perfect"). Future advances in computing may be enough to overwhelm the defences of PGP and its kind. More prosaically, a thief who stole a key could impersonate its careless owner—and nobody would ever know the difference.

Richard Hughes, the leader of the team at Los Alamos, thinks that using photons (the particles, or "quanta", of the quantum theory of light) to manufacture and distribute keys would correct these weaknesses. Individual photons possess properties that are governed by one of the basic laws of quantum mechanics, the uncertainty principle. A photon's polarisation, for example, can be measured against any of three yardsticks: the horizontal axis, the diagonal axis, and the circular axis. However, the more that is known about one of these, the less can be known about the others. In other words, if an exact measurement is taken of a photon's horizontal polarisation, nothing at all can be known about its polarisation on the diagonal or circular axes. Take the same measurement twice, and the answer will remain the same; but take one and then another, and the first answer becomes worthless.

A light in the distance

This feature of photons means that they can be used to construct single-use, self-destructing keys, rather like the envelopes in spy movies that conveniently explode when they get into the wrong hands. To agree upon a key, the sender and the recipient (by convention called Alice and Bob) must arrange to open a channel for sending the photons. Alice makes a string of photons, measures the polarisation of each as she pleases, and then sends them off to Bob. Bob measures the polarisation of each of the photons as it arrives, in any way he chooses.

From this point on, Bob and Alice can communicate without cloak or dagger. Bob rings up Alice and tells her what sort of measurements he performed, though not his results. Some of his measurements are likely to have overlapped with Alice's. She tells him which measurements to keep, and which to discard. They now both know which bits they share information about, and so are able to agree on the spot upon a private key that consists of this common string of bits.

Eve, an eavesdropper listening to their conversation, requires Alice's original string of photons in order to make head or tail of this exchange. This is where the natural safeguards of quantum physics make their advantages felt. If Alice had sent a beam of photons to Bob, Eve could have intercepted the beam and split it into two, taking a portion and sending the rest on to Bob, who may not notice the loss. But individual photons cannot be split: any photons that Eve intercepts, Bob will surely miss.

Should Eve adopt the so-called "bucket-brigade" strategy—to intercept and resend photons as quickly as she can—she will still give her presence away. The uncertainty principle dictates that Eve cannot copy Alice's photons exactly. The error she introduces by making faulty copies will be enough to trigger Bob's suspicions. Alice and Bob can then compress their common key in a way that will frustrate Eve's efforts.

In theory, the system also protects against future snooping. Because the mould that made this unique quantum key—the string of photons—is lost forever, it would remain invulnerable even if the daughters or grand-daughters of Eve were to possess unlimited computing power. And since the quantum key is not only made and used, but also discarded, on the spot, nobody can spirit it away and use it to impersonate Alice or Bob later on.

Other teams have already sent quantum keys over long stretches of optical fibre. But Dr Hughes's group has a loftier goal. Next month, it will test a system for distributing quantum keys under the cloudless skies of New Mexico. With a very faint laser, an outpost will emit a string of photons. Ten kilometres away, a telescope will try to discern these brief scintillations against the immense background noise of desert daylight. Early trials have suggested that the system will be able to send single photons reliably, day or night, and will not blink out of service when weather conditions do not suit it.

Since transmitting photons through the dense air at ground level is harder than transmitting straight up through the atmosphere to an orbiting satellite, Dr Hughes's experiment opens up the possibility that earth-to-satellite quantum-cryptography channels could be built. Once that happens, anybody within range of the satellite would have a completely secure way to get a quantum key. It seems that the ultimate in cryptographic technology may share much in common with the primitive. Telescopes hunting for distant glimmers of light will make a comeback. The flashes will just be a bit flashier.

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Post traumatic stress disorder

At the back of the mind

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Brain scanning is illuminating an ancient and invisible consequence of war

AS WITH many psychological conditions, the diagnosis of post traumatic stress disorder (PTSD) is, in effect, a self-diagnosis. A doctor has to take his patient's word that the patient is having terrifying flashbacks—and genuine sufferers are hard to distinguish from malingerers. But Talma Hendler of the Tel Aviv Sourasky Medical Centre, in Israel, and her colleagues, hope to change that. At a recent meeting of the Organisation for Human Brain Mapping, held in Brighton, England, they explained how brain-scanning has revealed differences in the ways that traumatised and healthy brains respond to the world. This enables researchers to peer into the subconscious of traumatised patients.

AP

The nightmare begins

PTSD affects people who have witnessed, or been involved in, life-threatening events such as war, rape or road accidents. The symptoms include flashbacks, nightmares, depression and heightened physiological arousal. Patients are permanently primed for fight or flight, and tend to startle more easily. But they also seem able—in what may be some kind of psychological defence mechanism—to block out reminders of the episode that traumatised them.

To find out what is going on, Dr Hendler and her colleagues used a technique called functional magnetic resonance imaging (fMRI). This directly measures activity (in the form of blood flow) in the brain, and thus provides a channel of information independent of a patient's report of his symptoms. The team conducted experiments on Israeli soldiers who had seen battle. Half of these reported suffering PTSD, the other half did not. Each subject was shown images both related and unrelated to combat—a man in uniform being an example of the first, and a man in a suit of the second.

The images were flashed in front of each subject when he was in an fMRI machine. At first, an image was made visible for too short a time to be perceived. Then, the period of exposure was increased until it was easily recognisable.

In these tests, subjects suffering from PTSD reported taking longer to identify combat-related images than did those from the healthy group. But the fMRI told a different story. In particular, the researchers noticed something intriguing about a region at the back of the brain called the lateral occipital complex (LOC), which is associated with object recognition. Here, they measured roughly the same level of activity in PTSD-sufferers as in healthy individuals when the stimuli were neutral. But when the images were combat-related, and presented near the patient's perceptual threshold, the LOC showed about a third more activity in the sufferers.

When the same sensitive images were presented subliminally (that is, for too short a period to be registered consciously), the PTSD-sufferers' LOC activity soared to twice that of the healthy group. So, although sufferers said that they could not see them, their brains were actually showing strong recognition responses. The opposite correlation, however, was seen in the healthy subjects. Their LOC activity decreased with their ability to identify a combat-related image.

It is too early to say whether fMRI could provide a reliable diagnosis of PTSD. But the findings suggest that brain-imaging techniques could be used to see "behind" conscious awareness, and thus to provide a more objective picture of brains that have been damaged by experience. According to Dr Hendler, if researchers can identify the precise whereabouts in the brain of the perceptual defence mechanism, they may be able to devise better treatments. For those who have suffered through the ages from shell shock, combat fatigue or their latest incarnation, PTSD—and who have received an alternative diagnosis of hypochondria or cowardice—that would be a welcome advance.

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Massive neutrinos

Lost and found

Jun 21st 2001
From The Economist print edition

The news that neutrinos have mass is both good and bad

PHYSICISTS are a notoriously absent-minded bunch. It is, nonetheless, exciting when they find something that has been lost for nearly 30 years. In a paper submitted on June 18th to *Physical Review Letters*, researchers at the Sudbury Neutrino Observatory (SNO) in Canada report the discovery of some missing neutrinos—the ones that theoreticians have long supposed the sun emits, but observers have been unable to detect.

Neutrinos come in three "flavours": electron, muon and tau. They are the lightest and least reactive of the elementary particles in the "standard model" of physics—the existing consensus of how things work. One explanation for the solar-neutrino deficit (only a third of the predicted number have been detected) is that electron-neutrinos produced by nuclear-fusion reactions in the sun's core mutate into the other two types, which are harder to detect. But that would be possible only if they had mass—and the standard model says that, like photons (the particles of which light is composed), they should be massless. Such mutations, known as neutrino oscillations, were hinted at three years ago by results from Super-Kamiokande, an older apparatus in Japan. The results from Sudbury show that they are definitely happening.

The SNO is located 2km underground in a nickel mine, to avoid interference from other forms of radiation (Super-Kamiokande is 1km down in a zinc mine). It consists of 1,000 tonnes of heavy water (the sort that has deuterium, a heavy form of hydrogen, in its molecules, instead of the normal, light form of the element). The heavy water is held in an acrylic sphere, and is surrounded by a network of nearly 10,000 photomultiplier tubes. These devices are sensitive to individual photons produced in the machine. Some of these photons come from "charged-current" interactions, which occur when an electron-neutrino (but not a neutrino of either of the other flavours) hits a deuterium nucleus. Others are created by electron scattering, when a neutrino of any flavour collides with an electron.

Super-Kamiokande is similar in design, but lacks heavy water. It is therefore sensitive only to electron scattering. (Electrons are found, of course, in both normal and heavy water.) So, although Super-Kamiokande detects all three types of neutrino, it cannot tell them apart. The SNO team showed that oscillation happens by comparing the number of charged-current interactions with the number of electron-scattering events in Super-Kamiokande. This allows the ratio of electron neutrinos to the other sorts to be worked out.

The Sudbury result explains the apparent deficit of neutrinos from the sun—but it also requires a radical rethinking of the standard model. When the results of a third way of detecting neutrinos, neutral-current interactions, are released towards the end of the summer, the SNO team should be able to explain how neutrinos change flavour, and thus how the standard model will need to be altered.

Besides explaining the lack of particles coming from the sun, the oscillation of neutrinos may also help to solve another conundrum: the lightness of the universe. Physicists have a pretty good idea how much it ought to weigh, but what can be seen at the moment falls far short of this. Some sort of invisible mass must be around, and neutrinos, even though their new-found mass is tiny, are abundant. According to David Wark of the University of Sussex, a British spokesman for the SNO, the new results show that neutrinos cannot account for all the missing matter. But every little helps.

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Non-quantum cryptography

Forever secret

Jun 21st 2001 | CAMBRIDGE, MASSACHUSETTS
From The Economist print edition

How to make an unbreakable code cheaply

EXPLOITING the quirks of quantum theory (see article) may not be the only way to create unbreakable codes. Michael Rabin and Yan Zong Ding, of Harvard University, think they can do much the same thing by overwhelming any eavesdropper with data.

Dr Rabin's scheme, which he calls hyper-encryption, and which he is presenting on June 26th at a meeting of the Institute of Electrical and Electronics Engineers in Washington, DC, relies on an intense stream of truly random numbers. This is available to both Alice and Bob (the conventional parties to cryptographic communications), and to anybody else—including Eve, a putative eavesdropper. Dr Rabin estimates that intensities of at least 50 billion bits per second can be broadcast from satellites using current technology.

Alice and Bob have a pre-arranged key, which specifies which random bits they will use to encrypt and decrypt their message. They then pluck the relevant numbers from the stream and store them. Eve, of course, does not know in advance which numbers to store, so her only option is to store them all. This, Dr Rabin estimates, would cost about $3 billion a year—a price beyond any organisation but a government. But unless she does so, her chances of breaking the code, for a 500-bit-long key, are less than one in 10^{50} (a one followed by 50 zeroes), even if she has intercepted the key.

What is truly remarkable about hyper-encryption is that the key can be reused without helping Eve to decipher the message. Even if she mounts a so-called adaptive attack, in which she obtains and uses the plain and encoded texts of previous messages, she is still almost as helpless as if she had no previous knowledge.

Best of all, hyper-encryption is cheap to use. A standard PC can easily perform the day-to-day encryption and decryption tasks. Soon, everybody could be Alice and Bob—and Eve may be forever cut out of the loop.

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Generals and politicians

Whose not to reason why?

Jun 21st 2001
From The Economist print edition

A former NATO commander in Europe lays out some provocative views on command-and-control in modern warfare

Get article background

Looking out for meddling civilians

Waging Modern War: Bosnia, Kosovo, and the Future of Combat
By General Wesley K.Clark

PublicAffairs; 512 pages; $30

Buy it at
Amazon.com
Amazon.co.uk

ONE of the avowed virtues of NATO, particularly after its post-cold-war makeover, is unquestioned civilian—and democratic—control over uniformed soldiers. Although the western alliance has in times past embraced dictatorial, army-backed regimes and still includes one large nation, Turkey, whose army can be bad news for its own citizens, NATO's self-chosen mission these days involves the promotion of modern western ideas about civil-military relations.

Because it is accepted, for example, that government ministers ought to be civilians, East European countries have been urged, as a price for closer links with NATO, to abandon the old communist practice of putting active generals in charge of defence ministries. Then again, service chiefs in NATO countries are expected to account more openly for how much and how well they spend taxpayers' money. Gone are the cold-war days when scrutinising military appropriations too closely could be made to seem unpatriotic.

But that, you could say, is the easy part. Good civil-military relations ought not to be judged by the fair-weather standards of peacetime but by the fog and urgency of war, when national survival itself may be at stake. What rules apply when generals must order soldiers to their deaths, and politicians have to justify these to the voters? The democratic experience seems to have confirmed that even in the bunkers where war cabinets meet a few simple distinctions are best observed: it is—surely—the job of generals to offer choices and explain risks, and of politicians to make decisions for generals to implement.

Well, no doubt. But anyone who thinks that this is accepted wisdom everywhere will get an alarm call from the memoirs of General Wesley Clark, the former NATO commander in Europe who, in 1999, led the 11-week air campaign which forced Yugoslavia to abandon control of Kosovo.

The Kosovo conflict was not a matter of survival for any of the 19 nations which, with varying enthusiasm, went to war against Slobodan Milosevic. Yet issues of principle were involved, and the general who oversaw the war thought of his own role as going far beyond giving advice and following orders. Especially after 1995, when General Clark helped broker a Bosnian peace deal, he regarded himself not merely as an executor but as a co-author of western policy in the Balkans.

In the run-up to the Kosovo campaign, he was frustrated by the shilly-shallying of governments who in his (probably correct) view wanted to benefit from a show of force without risking the messiness of war. Once the air war did start, General Clark had strong views on what to bomb and why, and he was enraged when his judgments were not fully heeded. The war, as he accurately observed, was not a contest of physical destruction but a battle of wills over how costly it would be for NATO to bend Mr Milosevic to its shifting demands, and he felt he was best placed to make the necessary daily decisions.

During the Kosovo campaign, General Clark was enraged when his judgments were not fully heeded

A cerebral soldier whose formative experiences included study at Oxford and a war wound in Vietnam

(where he concluded that America should have bombed harder and sooner), General Clark has thought a good deal about civil-military relations. In “Waging Modern War”, he argues that the information age has spawned a new type of limited warfare in which lines between political and military authority have become blurred, just as they would tend to be in an existential battle to the death. This is partly because modern communications allow viewers and voters to follow wars in more or less real time, putting politicians under pressure, as they see it, to micro-manage military conflicts, if only for fear of immediate blame when they fail.

But this blurring, General Clark believes, is a two-way business. “While it may seem desirable in theory”, he writes, “to separate military decision-making from policy formulation, in practice it is impossible...The top [military] leadership not only carries out the orders it receives, it may heavily influence their formulation.”

General Clark wants such influence to be greater still. In a bitter, though intriguing, work of self-justification, he describes backroom battles during and after the air war, for which he was punished a few weeks later by early retirement. He recalls his struggle with William Cohen, America’s defence secretary, and with the service chiefs for permission to use Apache helicopters, which could have shattered Serb forces in Kosovo. He describes, too, his difficulty in persuading NATOleaders of the need to prepare for a land operation.

The general succeeds, some of the time, in convincing the reader of the baseness of his tormentors’ motives. Critics of the war within the Pentagon had rightly predicted that the most immediate effect of NATO bombing would be to worsen misery for Serbs and Kosovars alike. On General Clark’s account, their objections appear as a mask for infighting between different military commands. Nor do NATOclosesinglequote>s leaders emerge here with credit. Too often they seemed to General Clark reluctant to face nettlesome facts or to warn voters that a war of conviction, which they claimed to be waging, entailed pain and risk.

Many of General Clark’s points are sound, and his underlying belief that politicians should listen to generals is not in serious dispute. His weakness is to confuse being listened to with having a free hand. If his aim was to show that soldiers in wartime should be insulated from civilian interference and allowed to “get on with the job”, he succeeds in doing the opposite. Many readers will shudder at the degree of power General Clark believed was his due.

America, to be sure, has a tradition of throwing up obstinate or headstrong commanders—McClellan, MacArthur and Westmoreland come to mind. But it also produces tough-minded presidents who keep them in hand—or fire them. For now, civilian control within NATO means, ultimately, control by America’s president. Should that be counted on to last?

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Blacks in the American forces

Double V for victory

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IN MOST of their country's wars, American blacks fought for a "double V", a duplicated letter that stands for two victories. The first victory was against the designated enemy. The second was against their own side's racism. It is bad enough that American forces were segregated until after the second world war—that during that war black soldiers were still housed in separate, inferior quarters; that they were given separate, and often vastly inferior, training and weapons; that in some army camps, they even had to sit behind German and Italian prisoners-of-war for entertainment events, including United Services Organisations (USO) shows. It is still worse that black military heroes were airbrushed out of their country's history in much the same way as purged communist leaders were in Stalin's Soviet Union.

American Patriots: The Story of Blacks in the Military from the Revolution to Desert Storm
By Gail Buckley

Random House; 532 pages; $29.95

Buy it at
Amazon.com
Amazon.co.uk

Gail Buckley sets out to correct this injustice in a book that has taken her 14 years to research and write. Like her mother, Lena Horne, who sang her heart out for the troops, Ms Buckley is as patriotic as they come. She is a journalist, not a professional historian, and her lack of thoroughness sometimes shows—she thinks, for instance, that Alf Landon, not Herbert Hoover, ran against Franklin Roosevelt in the 1932 presidential election, and more than halves the time that Joe Louis took to defeat Max Schmeling in 1938.

But she more than makes up for such slips by telling an important story well. She shows that blacks have had a significant role in nearly all America's wars, starting with the one against George III. Soon after George Washington, a Virginia slaveholder, took command of the Continental army in 1775, blacks were forbidden to serve. Military exigencies forced a change of tack. Midway through the war of independence, some 15% of the Continental army were black men and, wrote a contemporary observer, "they mix, march and sleep with whites."

But George Washington's was the last mixed American army for 175 years, though even during the American civil war, a conflict in which both sides started out committed to wage a "white man's" war, pressure of events in the end forced the recruitment of blacks. To the horror of the confederacy, the union eventually went so far as to send armed black soldiers into battle, most famously Colonel Robert Shaw's 54th Massachusetts regiment, whose heroism was celebrated in a relief by Augustus Saint-Gaudens and in a Hollywood film, "Glory" (1989).

In her effort to restore balance to American history, Ms Buckley reminds us of the racial prejudices of the good and the great. She notes how Thomas Jefferson found blacks inferior in "endowments of both body and mind", how Abraham Lincoln encouraged American blacks to emigrate to Liberia and Haiti, how Ulysses Grant's son promised his father that "no damned nigger will ever graduate from West Point", and how Dwight Eisenhower, as president, lent an ear to the argument of segregationist politicians that the doctrine of "separate but equal" was necessary to national defence.

But in noting the beams in their eyes, Ms Buckley is unaware of a mote in her own. Native Americans get shockingly short shrift when she brags that in the winning of the west one out of every five soldiers was black. She seems to share an older vision of America's manifest destiny and to treat the elimination of the country's indigenous people as a regrettable but necessary step in the advance of western civilisation. Is it progress when prejudice crosses the colour bar?

That apart, "American Patriots" has, in a sense, a happy ending. After its harsh birth in Korea and its stormy Vietnamese adolescence, America's fully-integrated army finally came of age in the Gulf war, the climax of Ms Buckley's story. Blacks, about 12% of the American population, provided not only the chairman of the Joint Chiefs of Staff, Colin Powell, now secretary of state; they made up 30% of the army, 22% of the navy, 17% of the front-line marines and 13% of the air force. And, Ms Buckley adds, of the 266 American soldiers killed in the Gulf, 15% were black. Robert Talley, an 18-year-old black army private killed by "friendly fire", was the youngest soldier to die there; Sergeant Joseph Murphy, a 58-

year-old black veteran of the Korean war, the oldest. In America's armed forces, Jim Crow at last was dead.

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Contemporary art

Take your trainers

Jun 21st 2001 | VENICE
From The Economist print edition

Labyrinthine worlds, death on film and parallel economies await art lovers at the 49th Venice Biennale

BECAUSE it is organised on national lines, the Venice Biennale, which runs until November 4th, has often been called the Olympics of the art world. This year it merited its nickname, literally. As several pavilions contained works that could be viewed only by a dozen or so people at a time, art lovers in the festival's first week thronged the gates at opening time and ran the length of a football field so as to reach the head of the queue and spare themselves hours of waiting. The sight of museum directors, curators and journalists sprinting, linen jackets flapping in the wind, surpassed much of the art on show.

And what did they see when they reached the finishing line? Two Canadians, Janet Cardiff and George Bures Miller, won the Biennale special award for a film installation that envelops viewers, placing them at the ambiguous heart of the cinematic experience. As you watch a film composed of clichéd suspense scenes, the sights and sounds of movie-watching merge uncannily into the film. Gregor Schneider, a German, won the Golden Lion for his transformation of the monumental architecture of his national pavilion into an obsessive labyrinth of rooms that viewers had to crawl through, suggesting both imprisonment and freedom.

Both works exemplified one thread in this year's Biennale: artists creating their own worlds, microcosms complete with sound and sculptural architecture. Pierre Huyghe, who also won a special award, transformed the French pavilion into a futuristic salon where viewers became part of the video installation and could play computer tennis on the ceiling's lighting.

Ernesto Neto, a Brazilian who professes that "only the libido can save us", creates biomorphic installations made of women's stockings filled with fragrant spices. His bodily structures, playing with the lure of sensuality, hang from ceilings in the Brazilian pavilion, the Palazzo Fortuny and the Arsenale. Robert Gober's American pavilion displays a series of cryptic, minimalist sculptures that could easily be items of forensic evidence. His clinical focus on what lies beneath the anodyne surface of things, emblemised by his sculptural cellar door, hints at creepy undercurrents in American society.

In one installation, women's stockings are filled with fragrant spices

As if to complement Mr Gober's minimalism, Richard Serra's mammoth torqued steel spiral in the Arsenale, imported from New York courtesy of Gucci, shows America's monumental, engineering spirit. The artist calls them "vessels you can walk into" and they take the viewer through a disorienting path, bordered by sloping 13ft-high walls that curl in to the centre. You cannot fail to be impressed by them, but their scale—dwarfing all around—feels hubristic.

A Biennale typically includes the national pavilions, the director's own exhibition and, in addition, several sideshows, which can contain the best excitements of all. This year, a British artist, Mike Nelson, created one of the Biennale's most stunning pieces in a disused beer factory on the Giudecca. For "The Deliverance and the Patience", the Turner-prize nominee spent months building a large-scale environment, where the viewer embarks on a journey through an elaborate fictitious space, as though walking into a film set which the players have just left.

Directing the 2001 Biennale is Harald Szeeman, the grand old man of independent curators. He came of age in the 1960s and was a friend of Joseph Beuys, the grandfather of the contemporary avant-garde. "My way of exhibition making is atmospheric, a way of catching what is in the air," Mr Szeeman says. Post-millennial angst must be spreading through the air like foot-and-mouth disease because much of the art he has chosen to show in a vast exhibition that sprawls over the Arsenale, the Italian pavilion and the gardens beyond groans with depression. Rather than "Plateau of Humanity", he could have called his show "Death in Venice".

You can see, for instance, a haunting video of a young woman trying to kill herself to the sound of the adagio from a Mozart piano concerto (Ene-Liis Semper; Estonia), chilly photos of hospital-like death chambers in American prisons (Lucinda Devlin; United States), a massacre of fashion models (Georgina Starr; Britain) and a video of a body being slowly whipped (Xu Zhen; China).

According to Mr Szeeman, many young artists are experiencing a sense of failure and disappointment with the world: “They are discovering that as soon as you enter real life it becomes melancholic,” he judges. If so, a dose of Prozac would not have gone amiss. An overkill of black boxes showing insubstantial media art results in countless moving images but creates few contemplative moments in which you can see and understand the art. Walking through Mr Szeeman’s darkened Arsenale is like being stuck in Plato’s cave, watching shadow-images without ever being allowed into the light.

“Fever Pitch” meets “Waiting for Godot”

That said, a few film-based works stand out and are worth mentioning. “Lasso” by Salla Tykka from Finland is a strangely beautiful subversion of the final scene from the epic film “Once upon a time in the West”. In “Uomoduomo”, Anri Salas, an Albanian, films a homeless man sleeping in a cathedral. Josef Dabernig from Austria offers a humorous black-and-white film of two men watching an imaginary football game: “Fever Pitch” meets “Waiting for Godot”. Bill Viola shows that he is still the old master of media art with his painterly video portraits.

Despite a reputation for spurning pigment, Mr Szeeman has given an older generation of artists a chance to show what paint can do. Cy Twombly has a room to himself for a series of stunning quasi-abstract meditations on history in bright finger-paint hues. Gerhard Richter’s dazzling diamond-shaped red paintings for the new cathedral of Padre Pio, rejected by the Vatican for being too abstract (and subsequently purchased by the Museum of Fine Arts in Houston), showed the simple spiritual power of colour and texture.

In the Belgian pavilion, Luc Tuymans shows that he deserves his reputation as one of the most influential painters working today. His subtle canvases on the theme of Patrice Lumumba, the murdered first president of the Congo, stretch the medium of painting to the limit with images resembling faded photographs that use pale tones and dull colours to convey how this bloody history has been literally whitewashed by the Belgian government. Beyond their political theme, these paintings possess an evocative aesthetic presence that outweighs much of the noisy art around them.

A third thread at Venice this summer is people who work in “parallel economies” outside the mainstream of capitalism. The most powerful is a Mexico-based artist, Santiago Sierra, who staged and filmed a performance entitled “200 people paid to have their hair dyed blond”. Concerned with the dispossessed in Europe’s midst, Mr Sierra paid illegal immigrants in Venice 120,000 lire (£40) each to have their hair dyed blond, the same bright hue that marked out Venetian courtesans in centuries past, so as to illustrate what outsiders will do to fit in. Such themes were echoed more soberly in the mini-retrospective of the late Alighiero Boetti (1940-94) in the Venice pavilion, who commissioned embroidered maps of the world from Afghan carpet weavers.

The vanity of the Biennale itself, its courtship of money, celebrity and beauty, was not lost on some artists. A Mexico-based Belgian artist, Francis Alys, sent a live peacock to the exhibition as a walking *vanitas*. An Italian, Francesco Vezzoli, staged a performance “Veruschka was here”, in which the beautiful, ageing model-cum-artist embroidered a picture of her younger face and held it up like a mirror. But a British artist, Keith Tyson, may unwittingly have penned the best single description of the Biennale in one of his drawings: it is called “Tried and tested techniques, traps and stratagems to be used in the construction of a labyrinth”.

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First novels

Gay hussars

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FOR six years, Maria McCann rose early to work for an hour before class on her first novel. The 45-year-old schoolteacher's dedication has paid off. When the historical "As Meat Loves Salt" was fact-checked by an expert on the English civil war, he found a single erroneous postal delivery vehicle—that's all.

As Meat Loves Salt
By Maria McCann

To be published in America by Harvest in Fall 2002
Flamingo; £14.99.

Buy it at
Amazon.co.uk
Amazon.co.uk

The powerfully built narrator, Jacob Cullen, may be a servant, but he's betrothed to a beautiful woman and edified by seditious anti-royalist pamphlets. Yet Jacob's bright future is laid waste by his fatally ferocious temper. Spotting armed horsemen come for him, he drags his new wife from their wedding, confesses to having killed a boy in anger, then rapes her in a wood to master her displeasure. When Jacob flees to Cromwell's army, befriending the charismatic soldier Ferris, Ms McCann's full-blooded battle scenes prove beyond doubt that war is not alone the province of male authors. Once Ferris and Jacob desert to start a utopian farming commune, homosexual undercurrents break the surface.

The world of this "gay" novel is far removed from the comfortable modern one in which such books command their own section in bookshops. In Cromwellian England, homosexuality was a hanging offence, and the lovers' fierce, obsessive relations are whetted by risk. Aptly, each man struggles for dominance over the other, much as royalist and parliamentary forces struggle for England. In the hands of a woman, the novel's edgy homo-erotica—more allusive than graphic—escapes the common hint of self-justification.

A brave choice, Ms McCann's jealous, brutal hero is unattractive by traditional lights, for he personifies why wrath is one of the seven deadly sins. But Jacob, who destroys what he loves with the rapacity of his desire, is as compelling as he is appalling. Ferris writes, "Violent love eats up what it does love, and is mere appetite."

Most impressively, the writing here is flawless. Ms McCann captures the flavour of 17th-century English, but never at the expense of comprehension; these pages flow like claret. The era's euphemistic conventions serve her well in describing both sex (his "blood was up") and battle. Single lines pack much in: "Like all beautiful and fickle persons, Zeb aroused a desperate loyalty in others." Absorbing and historically meticulous, Ms McCann's "As Meat Loves Salt" is a fat, juicy masterpiece.

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The media economy

Something will come of nothing

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THERE has always been a creative element to economic endeavour. Creativity predates civilisation in the sense that the idea of community living had to be thought of first, and anyone who has been to St Sophia in Istanbul will acknowledge the creativity of architects 1,500 years ago. But now we define and measure it. We take the core copyright industries—film, music, media, advertising, etc—add up their output and find it is worth more than $2,000 billion, 6-7% of the global economy.

The Creative Economy
By John Howkins

Allen Lane, The Penguin Press; 264 pages; £18.99

Buy it at
Amazon.co.uk

That is impressive enough: in the United States it is larger than almost any other industry. But this excludes the creative element in other industries: the design of a new Nokia phone or the imagination that went into the on-line delivery service of Tesco, a British supermarket. Add those up, if one were able to do so, and the creative element in the world economy would be larger still.

Definitions aside, the creative industries are getting a lot of attention these days partly because they are growing faster than the world economy as a whole, and, more importantly, because the creative element in a product or service may be one of the few ways of sustaining a competitive advantage. The need to protect copyright and enforce patents has shot up the global trade agenda. Countries such as America and Britain have an interest in both protecting their revenues and freeing trade in non-tangibles. Many of the trade issues of the next ten years seem likely to be related to intellectual property.

John Howkins picks his way through the many facets of creativity, unearthing surprising facts (for example, more new book titles are published in Britain each year than in any other country, including the United States). He interviews some high-profile creative people, and explains the complexity of patent and copyright law. He offers self-help tips to managers seeking to raise the element of creativity in their business.

This is all helpful, but it creates a book that is less than the sum of its parts. Analysing creativity is like wrestling with jelly: grab a bit and it slithers away. Being hard to define may well be one aspect of creativity. But in this respect, plodding, literal-minded readers could have done with a less creative book.

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New poetry

Trust in words

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From The Economist print edition

Even in political poetry, politics itself is best kept out of view

THE best political poets, on the whole, are those least anxious to write about politics. This is especially true of Irish poetry. W.B. Yeats is the classic example, a poet whose dreams were invaded by public catastrophe, and much the same could be said for Seamus Heaney. He is thought of by many readers as the persona of his first two books, a country-boy nostalgic for a rural life that, even then, in the 1960s, had already passed away. It was, in fact, Northern Ireland's troubles that made him; not, as some noisy spokesman for his tradition, but as a poet whose guilty ambivalence could register the time's complexities.

Now with the hope of something like peace, Mr Heaney's new book returns to the pastoral. "Electric Light" is full of references to that rural boyhood, which by now are perhaps a shade too automatic. More striking are recollections of the classical sources of pastoral, as he combines allusions to Homer and Virgil with sightseeing in Greece. The "Eclogues" of Virgil, written in the aftermath of an era of civil war, provide a suggestive analogy. Mr Heaney translates them, alludes to them and, in the beautiful "Bann Valley Eclogue", imitates them. Unlike the childhood poems, these are not programmatically idyllic. Much like Virgil's, they touch on new problems that peace may bring about.

The book is, by Mr Heaney's standards though, uneven. There are some major poems: "Out of the Bag", for example, about the family doctor who helped Mr Heaney and his siblings into the world. There are also characteristically stunning similes:

> ...a captivating brightness held and opened
> And the utter mountain mirrored in the lake
> Entered us like a wedge knocked sweetly home
> Into core timber.

But there are too many easy rambles through the past and too much casual craftsmanship. (Who else would think that in a formal elegy "produced" and "Massachusetts" could reasonably serve as a rhyme?)

This preoccupation with language-as-phenomenon runs all through contemporary poetry. Mr Heaney shares it with Englishmen like Geoffrey Hill and has passed it on to such juniors as Paul Muldoon, widely seen as his Northern Irish heir. But where Mr Heaney thinks of his "ground" and all the romantic pieties, Mr Muldoon is cosmopolitan, playful and irreverent. Where Mr Heaney's concern with the origin of words helps him approach the mystery of origins, Mr Muldoon suggests that language, far from disclosing reality, may cut us off from it. In a region like Northern Ireland that is split by communal conflict, moreover, tribal usage may blind us to common humanity.

In one of Mr Muldoon's best-known poems, a quoof ("our family word/For the hot-water bottle") comes between the poet and a girl he has in bed with him:

> I have taken it into so many lovely heads
> Or laid it between us like a sword.

The setting of "Quoof" is a New York hotel room and the girl speaks "hardly any English". This neutral ground is typical of Mr Muldoon, who lives in the United States and looks back on his troubled homeland

Electric Light
By Seamus Heaney

Faber and Faber; 82 pages; £14.99
Farrar, Straus and Giroux; 82 pages; $20

Buy it at
Amazon.com
Amazon.co.uk

Poems: 1968-1998
By Paul Muldoon

Farrar, Straus and Giroux; $35
Faber & Faber; £12.99

Buy it at
Amazon.com
Amazon.co.uk

Speech! Speech!
By Geoffrey Hill

Counterpoint; 80 pages; $23. Penguin (November); £9.99

Buy it at
Amazon.com
Amazon.co.uk

The Darkness and the Light
By Anthony Hecht

Knopf; 68 pages; $23

Buy it at
Amazon.com

with Joycean detachment. “Poems 1968-1998” is a massive achievement, persistently inventive at every stage. It is likely to persuade even those who, like this reviewer, dislike such poems as the interminable “Madoc”, which seem entirely made up of opaque fictions and verbal play. For Mr Muldoon is truly moving when, by contrast, he lets the veil of his inventions slip and we glimpse the world behind it.

A comparable effect is achieved by Geoffrey Hill, although no one, until recently, would have thought of his work as playful. In the past, he has reflected on the history of words: how etymology records the departure of language from primal truths. Mr Hill's quarrel with language is now exacerbated by what he calls “anomie”, the tendency of modern culture to forget its past: “files pillaged and erased/in one generation”. With bitter irony, he takes on the kinds of language that promote such amnesia: media-talk, cyberspeak, the oily evasions of management. “Speech! Speech!” is part invective, part self-mockery, an angry and anguished engagement with the enemy in a sort of interior monologue. The form recalls the sonnet-sequence, though the “sonnets” are rhymeless and, significantly, shorn of the resolving final couplet. Mr Hill's satire is fierce and sometimes quite funny, but not funny enough to compensate for the loss of his old sonorities, of which from time to time we are movingly reminded:

> See all as miracle, a natural graft,
> as mistletoe ravelling the winter boughs
> with nests that shine.

But we are reminded of it only to have it subverted. What is more, the poems are often deeply obscure. Mr Hill has always been difficult, but the beauty of his writing helped readers persevere. In “Speech! Speech!” there is less to draw you in.

Mr Hill is one of several poets around the age of 70 whose outlook was shaped by the news of the Holocaust. Anthony Hecht is another such writer: one of that small group of American poets who cannot avoid a European dimension. The achievement of poets of this kind has been to confront the horrors of their age with a poetry rich in civilised resource. Mr Hecht's seventh collection, “The Darkness and the Light”, broods on memories of war and the darker sides of love. As ever, the poems are elegantly formal and lucid in argument, but alas, the emotional temperature is not as it once was and, though there are fine pieces here, there is also much that can only be called pedestrian. In the age of Mr Muldoon and post-modern reflexiveness, perhaps it is hard to maintain a trust in words.

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Victor Paz Estenssoro

Jun 21st 2001
From The Economist print edition

Victor Paz Estenssoro, a power in Bolivian politics, died on June 7th, aged 93

Reuters

Get article background

THE politics of Victor Paz Estenssoro were forged in Bolivia's disastrous war with Paraguay in 1932-35. For many years Bolivia's other neighbours, Chile, Peru, Argentina and Brazil, had hacked away at its borders. Chile stripped Bolivia of its coastline, leaving it landlocked. Now Bolivia had been defeated by Paraguay in a struggle for a piece of territory called the Chaco. For Mr Paz, the Chaco war, as it was called, and in which he had fought as a humble soldier, had laid bare the country's weaknesses. Tin-mine owners and rural landlords were immensely rich; the Indians who made up four-fifths of the population lived in near-serfdom. The army was poorly paid and led: thousands of Indian soldiers had died of thirst and disease in the scrub of the Chaco.

Mr Paz's family were large landowners. He had had a privileged education, studying law and economics, and had worked briefly as a civil servant. Now, though, he joined a group of soldiers and civilians who formed the National Revolutionary Movement, which mixed a modernising nationalism with touches of Mussolini-style corporatism. It remains Bolivia's most important political party. The party gained power in a coup in 1943. Mr Paz was finance minister. Three years later the government was thrown out in another coup. Its leader was hanged from a lamp-post outside the presidential palace in La Paz. Mr Paz escaped to Argentina.

In 1951, while in exile, Mr Paz was elected president, but a military group took power instead. The following year there was a popular uprising in Bolivia—the 179th, according to a meticulous historian tracing protest back to the days when the country was ruled by Spain. After three days of fighting, which left 500 people dead, Victor Paz's supporters triumphed. He flew in from Buenos Aires and was mobbed by jubilant crowds as he made his way to the presidential palace. As a show of public feeling for change, it was perhaps the most dramatic of Latin American revolutions between those of Mexico in 1910 and Cuba in 1959.

The return to exile

"This is not an anti-capitalist government," Mr Paz assured any nervous foreign observers of Bolivia's wobbly politics, particularly those in the United States. "We want to ensure progress for the majority." Over the next four years his government pushed through a programme of democratic reform, which laid the foundations of a modern nation. He gave the vote and a free education to the illiterate majority, nationalised the tin mines, and split up the great estates into family-size plots.

When John Kennedy became president of the United States in 1961, Mr Paz supported his "alliance for progress", an attempt to forestall communism in Latin America with development aid. But Mr Paz found himself squeezed between trade union demands for more nationalisation, led by the miners, and the anti-communism of the armed forces. In 1964, a few months into Mr Paz's third term as president, Bolivia was again returned to military rule.

Mr Paz spent much of the next 20 years in exile, part of the time in the United States, part in Peru where he taught economics at Lima university and wrote newspaper articles. If Bolivia was noticed much by the outside world at this time it may have been because of attempts by Che Guevara to organise a guerrilla force against the military rulers. Guevara was captured and executed in 1967.

When Mr Paz was elected for the fourth and last time in 1985, at the age of 78, Bolivia had changed again, mostly for the worse. The army was associated with drug trafficking and brutality. The unions had been debilitated, their members suffering from years of inflation, at one time reaching ridiculous heights. Mr Paz's own revolutionary days seemed to be past. Yet in his last term he laid the foundations of a new period of democratic stability and economic growth—but also partially undid the legacy of 1952.

He introduced free-market reforms, of a kind soon to be imitated across Latin America. Inflation was vanquished, and the loss-making state-owned mining company was wound up. When Mr Paz's old friends the miners again marched on La Paz, the government stopped them with tanks, though they did not fire.

In 1989, Mr Paz retired to his family house in Tarija, a pleasant town in the Andean foothills, at the centre of a small wine industry; to his fruit trees and books, and, a lifelong interest, photography. He was twice married, and had five children. He was sometimes called *el mono* (the monkey) because of his protuberant mouth and high forehead. But more often he was known, even by political opponents, as *el doctor,* a term of deferential respect used of lawyers.

He towered over Bolivia's political life for the past half century. His search for political opportunity took him into unseemly alliances with military leaders. But he preserved personal probity, and an air of statesmanship. He was no populist rabble-rouser, but a pragmatic technocrat, committed to modernising Bolivia. It is given to few individuals to change the course of their country's history, let alone to do so twice. Yet that was what Victor Paz Estenssoro achieved in Bolivia.

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Overview

Jun 21st 2001
From The Economist print edition

America is fretting about the return of stagflation, as consumer-price inflation jumped even as the economy continued to flag. Consumer prices rose by 0.5% in May, faster than expected. This pushed up inflation to 3.6%, from 3.3% in the year to April; excluding food and energy, the rate was 2.5%. Meanwhile, industrial output fell in May for the eighth successive month, dropping to a level 2.8% lower than a year earlier.

The **euro area** also looked increasingly sickly. Consumer-price inflation in the year to May jumped to an eight-year high of 3.4%. The increase from 2.9% in April was bigger than the markets had expected. However, industrial production dropped in April by 0.5%, cutting the annual rate of growth to just 1.6%, the slowest for almost two years. These figures increase the risk of an industrial recession—two successive quarters of declining output—in the euro area.

The euro area's growth difficulties remain worst in **Germany**. The country's economics minister gave warning that the economy might not grow at all in the second quarter. The Kiel-based Institute of World Economics cut its forecast for this year to 1.3%, considerably lower than the German government's projection of 2%.

Britain is once again a two-speed economy. Domestic demand is bubbling away even as exporters wilt from the strong pound and the slowdown in world trade. Consumers have been on a shopping spree: retail sales rose by 6.4% in the year to May. But exports fell in value by 1.6% in April. The trade gap in goods and services swelled to £5.6 billion in the three months to April, the highest since the third quarter of 1989.

The **Japanese** stockmarket fell by 1.2%. Sentiment about the economic outlook, already gloomy, was further depressed when the Bank of Japan downgraded its assessment of the economy.

Commodities

The global slowdown is taking the sparkle out of diamonds. De Beers, which controls two-thirds of the world's trade in uncut stones, says that sales of rough diamonds have so far been worth $2.6 billion this year—a quarter lower than in the first half of 2000. The decline in sales was strongly influenced by America, which accounts for nearly half of world demand for diamond jewellery.

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Output, demand and jobs

Jun 21st 2001
From The Economist print edition

% change at annual rate

	GDP		The Economist poll GDP forecasts		Industrial production	Retail sales (volume)	Unemployment % rate	
	1 qtr	1 year	2001	2002	1 year	1 year	latest	year ago
Australia	+ 4.3	+ 2.1 Q1	+ 2.1	+ 3.9	+ 3.1 Q4*	+ 3.0 Q1	6.9 May	6.5
Austria	+ 1.7	+ 2.6 Q4	+ 2.1	+ 2.4	– 5.0 Mar*	– 1.1 Feb	3.7 Apr	3.7
Belgium	+ 1.8	+ 2.4 Q1	+ 2.5	+ 2.6	– 4.1 Apr*	+ 5.2 Mar	10.0 May*	10.1
Britain	+ 1.7	+ 2.6 Q1	+ 2.2	+ 2.7	– 0.8 Apr	+ 6.4 May	5.0 Apr‡	5.7
Canada	+ 2.5	+ 2.6 Q1†	+ 2.2	+ 3.1	+ 0.7 Mar	+ 3.0 Mar	7.0 May	6.6
Denmark	+ 4.9	+ 1.1 Q4	+ 1.8	+ 2.2	+ 1.7 Apr	+ 0.2 Apr	5.4 Apr	5.3
France	+ 2.0	+ 2.7 Q1	+ 2.4	+ 2.5	+ 1.9 Apr	– 0.3 Apr	8.7 Apr	9.9
Germany	+ 1.5	+ 1.6 Q1	+ 1.6	+ 2.3	+ 1.0 Apr	– 0.7 Apr	9.3 May	9.6
Italy	+ 2.8	+ 2.4 Q1	+ 2.1	+ 2.3	+ 2.6 Apr	– 0.2 Mar	9.9 Jan	11.2
Japan	– 0.8	– 0.1 Q1	+ 0.5	+ 1.3	– 4.2 Apr	+ 0.1 Apr	4.8 Apr	4.8
Netherlands	+ 0.2	+ 2.0 Q1	+ 2.6	+ 2.9	+ 0.2 Apr	– 3.1 Feb	1.9 May§	2.8
Spain	+ 4.1	+ 3.3 Q1	+ 2.8	+ 3.0	+ 0.2 Apr	na	13.1 Apr	14.4
Sweden	+ 2.4	+ 2.3 Q1	+ 2.4	+ 2.9	+ 6.2 Mar	+ 2.3 Apr	3.5 May*	4.1
Switzerland	+ 7.4	+ 2.5 Q1	+ 1.9	+ 2.1	+ 5.0 Q4*	+ 2.2 Mar	1.7 May*	1.9
United States	+ 1.3	+ 2.5 Q1	+ 1.6	+ 2.9	– 2.8 May	+ 2.5 Apr	4.4 May	4.1
Euro area	+ 2.0	+ 2.5 Q1	+ 2.2	+ 2.5	+ 1.6 Apr	+ 1.6 Mar	8.3 Apr	9.0
MORE COUNTRIES	Data for the countries below are not provided in printed editions of *The Economist*							
Finland	nil	+ 3.4 Q1	na	na	– 0.7 Apr	+ 5.5 Feb	11.3 May*	11.9
Greece	na	+ 2.5 2000	na	na	+ 8.5 Feb*	+ 5.1 Mar	na	na
Iceland	na	+ 3.6 2000	na	na	+ 4.2 1999	na	1.5 Apr	1.5
Ireland	na	+11.0 Q3	na	na	+17.0 Apr*	+ 1.6 Mar	3.7 May	4.2
Luxembourg	na	+ 8.5 2000	na	na	+ 0.2 Feb*	+ 6.7 Mar	2.5 Apr	2.6
New Zealand	+ 2.2	+ 1.6 Q4	na	na	+ 0.9 Q4*	+ 1.7 Q1	5.4 Q1	6.4
Norway	+ 0.9	+ 0.3 Q1	na	na	+ 1.1 Apr	– 1.0 Apr	3.7 Q1	3.9
Portugal	+ 2.2	+ 3.4 Q4	na	na	+ 4.5 Apr*	+ 5.3 Mar	3.8 Q4	4.1

*Not seasonally adjusted. †New series. ‡Feb-Apr; claimant count rate 3.2% in May. §Mar-May

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Prices and wages

Jun 21st 2001
From The Economist print edition

% change at annual rate

	Consumer prices*			The Economist poll consumer prices forecast		Producer prices*			Wages/earnings		
	1 year		year ago	2001	2002	1 year		year ago	1 year		year ago
Australia	+ 6.0	Q1	+ 2.8	+ 3.6	+ 2.3	+ 5.2	Q1	+ 5.6	+ 5.6	Q1	+ 2.9
Austria	+ 3.4	May	+ 1.8	+ 1.9	+ 1.4	+ 3.1	May	+ 2.7	+ 2.6	Apr	+ 2.0
Belgium	+ 3.1	May	+ 2.2	+ 2.1	+ 1.8	+ 4.7	Apr	+ 7.5	+ 1.9	Q1	+ 3.3
Britain	+ 2.1	May	+ 3.1	+ 2.0	+ 2.3	+ 0.6	May	+ 2.5	+ 5.2	Apr	+ 5.1
Canada	+ 3.9	May	+ 2.4	+ 2.4	+ 2.1	+ 2.7	Apr	+ 5.7	+ 1.3	Mar	+ 3.0
Denmark	+ 2.7	May	+ 3.3	+ 2.3	+ 2.2	+ 2.9	May	+ 6.4	+ 3.8	Q4	+ 4.1
France	+ 2.3	May	+ 1.5	+ 1.5	+ 1.5	+ 2.9	Apr	+ 3.5	+ 5.0	Q4	+ 3.4
Germany	+ 3.5	May	+ 1.4	+ 2.3	+ 1.5	+ 4.0	May	+ 4.9	+ 1.7	Mar*	+ 2.1
Italy	+ 3.0	May	+ 2.5	+ 2.5	+ 1.9	+ 4.3	Apr	+ 5.4	+ 2.6	Apr*	+ 2.1
Japan	− 0.4	Apr	− 0.8	− 0.4	− 0.3	+ 0.9	May	− 0.6	+ 0.2	Apr	+ 2.2
Netherlands	+ 4.9	May	+ 2.4	+ 4.0	+ 2.3	+ 5.6	Apr	+ 7.3	+ 3.3	Apr	+ 3.4
Spain	+ 4.2	May	+ 3.2	+ 3.3	+ 2.6	+ 2.8	Apr	+ 5.7	+ 2.2	Q4	+ 2.4
Sweden	+ 3.0	May	+ 1.4	+ 1.9	+ 1.7	+ 3.3	Apr	+ 3.3	+ 2.1	Mar*	+ 3.4
Switzerland	+ 1.8	May	+ 1.6	+ 1.2	+ 1.2	+ 0.4	May	+ 3.0	+ 1.3	2000	+ 0.3
United States	+ 3.6	May	+ 3.2	+ 2.9	+ 2.4	+ 3.8	May	+ 3.7	+ 4.3	May	+ 3.6
Euro area	+ 3.4	May	+ 1.9	+ 2.3	+ 1.7	+ 4.1	Apr	+ 4.7	+ 2.4	Q4	+ 2.3
MORE COUNTRIES	Data for the countries below are not provided in printed editions of *The Economist*										
Finland	+ 3.4	May	+ 2.9	na	na	+ 3.0	May	+ 8.6	+ 5.0	Q1*	+ 3.5
Greece	+ 3.6	May	+ 2.9	na	na	+ 5.1	Apr	+ 7.0	na		na
Iceland	+ 6.8	Jun	+ 5.5	na	na	+ 5.7	May	+ 3.6	+ 9.2	Apr	+ 5.3
Ireland	+ 5.4	May	+ 5.2	na	na	+ 2.9	Apr	+ 5.4	+ 6.4	Q4*	+ 7.3
Luxembourg	+ 3.3	May	+ 2.5	na	na	+ 3.6	Mar	+ 3.2	+ 7.2	Mar*	+ 4.2
New Zealand	+ 3.1	Q1	+ 1.5	na	na	+ 7.8	Q1	+ 4.9	+ 1.8	Q1	+ 1.4
Norway	+ 4.3	May	+ 2.8	na	na	+ 4.6	May	+ 8.0	+ 4.3	Q4*	+ 4.0
Portugal	+ 4.8	May	+ 2.6	na	na	+ 3.2	Apr	+17.7	+ 2.2	Feb*	+ 2.8

*Not seasonally adjusted.

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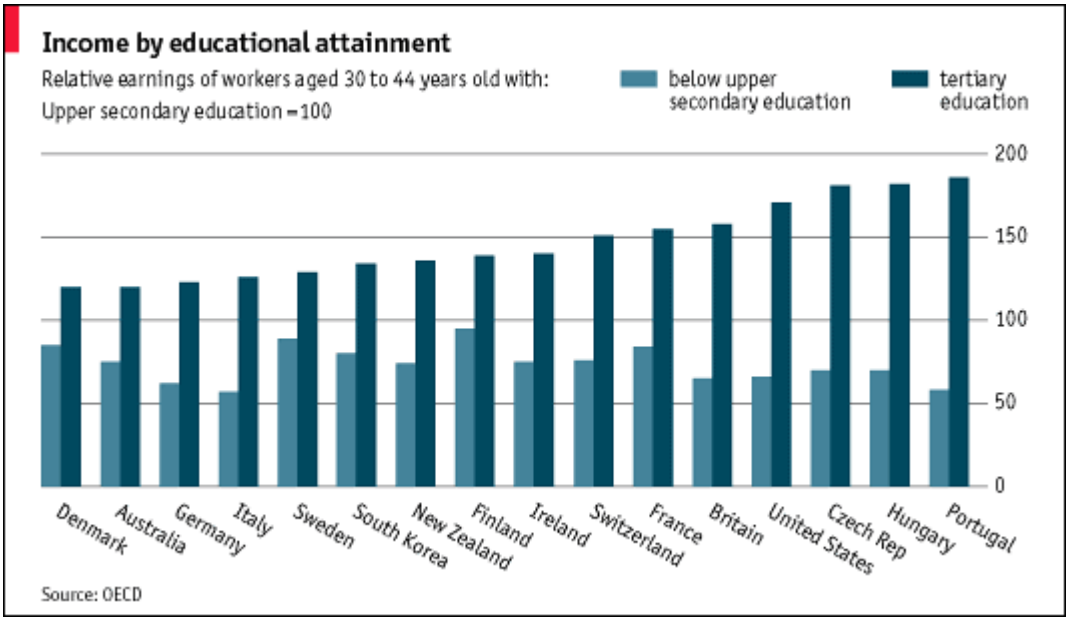
Income by educational attainment

Jun 21st 2001
From The Economist print edition

Education pays off handsomely in higher earnings across the rich world. In some countries, prime-age workers who failed to complete their education at secondary schools earn little more than half as much as those who did finish it. In turn, those who went on to attain a diploma or a degree earn substantially more than those who did not go into higher education at all.



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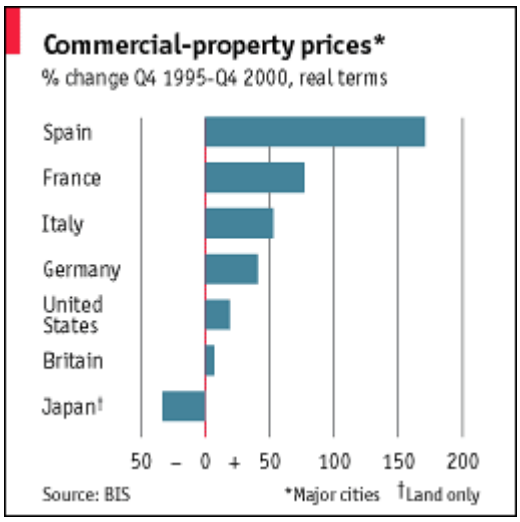
Commercial-property prices

Jun 21st 2001
From The Economist print edition

Over the past five years, commercial-property prices in Spain have risen by a massive 171% in real terms. At the other extreme, Japanese property prices have fallen by 33%.



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Commodity price index

Jun 21st 2001
From The Economist print edition

1995=100

	Jun 12th	Jun 19th*	% change on one month	% change on one year
Dollar index				
All items	69.7	69.5	– 3.2	– 6.0
Food	67.8	67.9	– 0.3	– 6.7
Industrials				
All	72.3	71.7	– 6.6	– 5.2
Nfa†	71.7	70.8	– 7.6	+ 0.1
Metals	72.9	72.4	– 5.8	– 9.1
Sterling index				
All items	79.8	78.2	– 1.3	+ 1.0
Euro index				
All items	108.0	106.6	– 2.1	+ 4.7
Yen index				
All items	90.5	90.8	– 3.0	+ 9.4
Gold				
$ per oz	269.60	274.45	– 3.0	– 4.2
West Texas Intermediate				
$ per barrel	29.52	27.32	– 7.1	–17.5

* Provisional. † Non-food agriculturals.

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Stockmarkets

Jun 21st 2001
From The Economist print edition

Market indices

	Jun 20th	2001 high	2001 low	% change on one week	% change on record high	% change on Dec 31st 2000 in local currency	% change on Dec 31st 2000 in $ terms
Australia (All Ordinaries)	3,348.4	3,370.7	3,094.3	+ 0.7	- 0.7	+ 6.1	- 1.0
Austria (ATX)	1,232.2	1,244.9	1,052.2	- 1.0	-29.1	+14.8	+ 4.2
Belgium (Bel 20)	2,841.6	3,030.4	2,591.6	- 0.5	-22.8	- 6.0	-14.7
Britain (FTSE 100)	5,699.6	6,334.5	5,314.8	- 2.1	-17.8	- 8.4	-14.4
Canada (Toronto Composite)	7,675.7	9,348.4	7,415.5	- 4.2	-32.6	-14.1	-15.7
Denmark (Copenhagen SE)	905.9**	1,002.1	818.3	- 0.3	-12.8	- 0.1	- 9.2
France (SBF 250)	3,317.4	3,820.2	3,107.9	- 3.5	-24.4	-12.0	-20.2
(CAC 40)	5,170.5	5,998.5	4,824.8	- 3.4	-25.3	-12.8	-20.8
Germany (Xetra DAX)	5,876.0	6,795.1	5,388.0	- 3.9	-27.1	- 8.7	-17.1
Italy (BCI)	1,609.5	1,948.4	1,609.5	- 5.1	-26.2	-16.0	-23.8
Japan (Nikkei 225)	12,674.6	14,529.4	11,819.7	- 1.2	-67.4	- 8.1	-14.8
(Topix)	1,257.1	1,441.0	1,162.0	- 1.2	-56.4	- 2.1	- 9.3
Netherlands (AEX)	552.0	642.3	518.3	- 4.3	-21.3	-13.4	-21.4
Spain (Madrid SE)	870.7	963.9	818.6	- 4.7	-24.0	- 1.1	-10.3
Sweden (Affarsvarlden Gen)	228.4	292.7	217.2	- 4.9	-42.9	-17.6	-27.5
Switzerland (Swiss Market)	7,218.3	8,135.4	6,574.0	- 3.4	-14.2	-11.3	-19.6
United States (DJIA)	10,647.3	11,337.9	9,389.5	- 2.1	- 9.2	- 1.3	- 1.3
(S&P 500)	1,223.1	1,373.7	1,103.3	- 1.5	-19.9	- 7.4	- 7.4
(Nasdaq Comp)	2,031.2	2,859.2	1,638.8	- 4.3	-59.8	-17.8	-17.8
Europe (FTSE Eurotop 300) *	1,380.4	1,545.5	1,279.0	- 3.0	-19.0	-10.0	-18.3
Euro area (FTSE Ebloc 100) *	1,222.4	1,404.1	1,143.9	- 3.9	-21.2	-12.2	-20.3
World (MSCI) †	1,081.7	1,249.2	1,014.6	- 2.0	-25.3	na	-11.4
World bond market (Salomon) ‡	427.3	447.8	425.0	nil	- 7.1	na	- 3.8

*In euro terms. †Morgan Stanley Capital International index includes individual markets listed above plus eight others, in dollar terms. ‡Salomon Smith Barney World Government Bond Index, total return, in dollar terms. **June 14th.

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Trade, exchange rates and budgets

Jun 21st 2001
From The Economist print edition

	Trade balance*, $bn latest 12 months		Current account $bn latest 12 mths		The Economist poll % of GDP, forecast 2001	2002	Exchange rate trade-weighted† Jun 20th	year ago	Currency units per $ Jun 20th	year ago	per £	per euro	per ¥100	Budget balance % of GDP 2001‡
Australia	− 2.6	Apr	− 12.9	Q1	− 2.4	− 2.5	73.7	78.0	1.93	1.66	2.69	1.64	1.56	0.1
Austria	− 5.5	Mar	− 4.2	Mar	− 2.5	− 2.4	99.8	100.1	16.2	14.5	22.5	13.8	13.1	-0.6
Belgium	+ 12.5	Apr	+ 11.6	Dec	+ 4.1	+ 4.3	98.2	99.0	47.4	42.6	66.1	40.3	38.4	0.7
Britain	− 44.2	Apr	− 24.5	Q4	− 2.0	− 2.1	106.4	104.2	0.72	0.67	–	0.61	0.58	1.2
Canada	+ 40.4	Mar	+ 22.2	Q1	+ 1.5	+ 1.1	79.0	80.3	1.53	1.47	2.14	1.30	1.24	2.6
Denmark	+ 6.1	Apr	+ 3.9	Apr	+ 1.4	+ 1.5	101.0	100.8	8.75	7.88	12.2	7.45	7.10	2.9
France	+ 0.5	Apr	+ 21.3	Apr	+ 1.8	+ 1.8	100.7	101.8	7.70	6.93	10.7	6.56	6.24	-0.5
Germany	+ 54.4	Apr	− 21.3	Apr	− 1.2	− 0.9	97.5	98.5	2.30	2.07	3.20	1.96	1.86	-1.7
Italy	+ 1.6	Mar	− 5.6	Feb	− 0.3	nil	71.9	72.6	2,273	2,047	3,171	1,936	1,843	-1.3
Japan	+ 98.9	Apr	+106.4	Apr	+ 2.2	+ 2.2	139.2	155.4	123	106	172	105	–	-6.3
Netherlands	+ 16.5	Mar	+ 16.0	Q1	+ 3.7	+ 3.8	97.0	97.9	2.59	2.33	3.61	2.20	2.10	1.3
Spain	− 39.1	Mar	− 16.7	Mar	− 2.9	− 2.6	73.6	74.2	195	176	272	166	158	nil
Sweden	+ 11.0	Mar	+ 5.5	Apr	+ 2.2	+ 2.2	75.6	85.2	10.72	8.72	15.0	9.13	8.69	3.6
Switzerland	− 0.1	May	+ 31.1	Q4	+11.8	+11.4	107.1	106.2	1.79	1.64	2.50	1.52	1.45	na
United States	−454.6	Mar	−434.9	Q4	− 4.2	− 4.0	121.0	109.2	–	–	1.40	0.85	0.81	2.1
Euro area	− 6.8	Apr	− 32.6	Mar	− 0.3	− 0.2	76.7	79.8	1.17	1.06	1.64	–	0.95	-0.6
MORE COUNTRIES	Data for the countries below are not provided in printed editions of *The Economist*													
Finland	+ 13.7	Apr	+ 9.5	Apr	na	na	77.3	77.0	6.73	6.28	9.39	5.73	5.46	5.3
Greece	− 7.5	Q4	− 7.7	Jan	na	na	57.0	58.1	385	356	537	328	312	nil
Iceland	− 0.4	Apr	− 0.9	Q4	na	na	na	na	97.1	76.7	135	82.7	78.7	2.4
Ireland	+ 27.6	Mar	− 0.7	Q4	na	na	86.0	87.8	1.12	0.83	1.56	0.95	0.91	4.5
Luxembourg	− 2.4	Mar	+ 1.6	Q4	na	na	98.2	99.0	45.6	42.6	63.6	38.8	37.0	3.6
New Zealand	− 0.3	Apr	− 2.7	Q4	na	na	79.7	82.5	2.36	2.11	3.30	2.01	1.92	1.0
Norway	+ 28.1	May	+ 24.9	Mar	na	na	96.2	91.5	9.11	8.69	12.7	7.76	7.39	15.3
Portugal	− 10.9	Mar	− 10.1	Mar	na	na	88.7	89.3	227	212	316	193	184	-1.2

*Merchandise. Australia, Britain, France, Canada, Japan and United States imports fob, exports fob. All others cif/fob. †1990=100, Bank of England. ‡OECD estimate.

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Money and interest rates

Jun 21st 2001
From The Economist print edition

	Money supply* % change on year ago			Interest rates % p.a. (Jun 20th 2001)					
				3-mth money market		2-year	10-year gov't bonds		corporate
	narrow	broad		latest	year ago	gov't bonds	latest	year ago	bonds
Australia	+13.5	+ 7.0	Apr	4.96	6.27	5.10	5.82	6.19	7.39
Britain	+ 7.7	+ 7.9	Apr	5.16	6.06	5.42	5.14	5.12	6.63
Canada	+11.4	+ 4.8	Apr	4.22	5.56	4.70	5.71	5.85	7.15
Denmark	+ 1.5	– 3.5	Apr	5.05	5.09	4.78	5.24	5.53	7.18
Japan	+ 7.0	+ 2.9	May	0.01	0.03	0.02	1.17	1.65	1.33‡
Sweden	+ 5.8	– 0.3	Apr	4.30	3.96	4.93	5.34	5.06	5.70
Switzerland	– 1.2	+ 2.2	May	3.24	3.45	3.99	3.34	3.96	4.03
United States	+ 1.0	+10.9	May	3.61	6.71	3.95	5.20	6.01	7.08
Euro area†	+ 1.8	+ 5.2	Apr	4.45	4.69	4.24	4.93	5.04	5.62

*Narrow: M1 except Britain and Sweden M0, broad: M2 or M3 except Britain M4. †Germany for bonds.‡ New series. Benchmarks: US 30-year 5.66%, Japan No.231 1.20%. Central bank rates: US fed funds 4.00%, ECB refinancing 4.50%, BOJ overnight call 0.01%, BOE repo 5.25%. Sources: Commerzbank, Danske Bank, J.P. Morgan Chase, Royal Bank of Canada, OM Fixed Income Exchange, Warburg Dillon Read, DRI-WEFA, Westpac, Thomson Financial Datastream. Rates cannot be construed as banks' offers.

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Overview

Jun 21st 2001
From The Economist print edition

Domingo Cavallo, **Argentina's** economy minister, has introduced what amounts to a dual exchange rate. The currency board remains in place, but by offering exporters a subsidy and importers a tariff, the peso has in effect been devalued by around 7%. The measure was applauded at home, but nervous foreign investors were less impressed, pushing up yields on Argentina's debt. Share prices closed 5.9% down over the week.

Thailand's GDP growth slowed to 1.8% in the year to the first quarter, its slowest for two years. **Poland**'s industrial production fell by 1.0% in year to May. India's rose by 2.7% in the year to April.

Share prices in **Moscow** jumped to a new high for the year, after a management shake-up at Gazprom. The market has gained 53% since the start of 2001. Jakarta rose by 3.7% after relations between the government and the IMF improved.

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Financial markets

Jun 21st 2001
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	Currency units			Interest rates	Stockmarkets	% change on		
	per $		per £	short-term	Jun 20th		Dec 31st 2000	
	Jun 20th	year ago	Jun 20th	% p.a.		one week	in local currency	in $ terms
China	8.28	8.28	11.5	na	2,256.5	-3.5	+2.9	+2.9
Hong Kong	7.80	7.79	10.9	3.68	12,918.7	-4.5	-14.4	-14.4
India	47.0	44.7	65.5	7.37	3,406.1	-2.7	-14.3	-14.8
Indonesia	11,290	8,670	15,752	16.77	432.3	+3.7	+3.8	-11.0
Malaysia	3.80	3.80	5.30	3.30	586.1	-2.1	-13.8	-13.8
Philippines	52.3	42.8	72.9	10.81	1,449.5	-0.9	-3.0	-7.2
Singapore	1.82	1.73	2.54	2.25	1,684.8	-0.7	-12.6	-16.7
South Korea	1,304	1,119	1,819	5.60	595.7	-3.0	+18.1	+14.5
Taiwan	34.4	30.8	48.1	4.10	5,029.6	-3.5	+6.0	+1.8
Thailand	45.3	39.2	63.1	4.00	318.5	-2.0	+18.3	+13.4
Argentina	1.00	1.00	1.39	10.44	419.6	-5.9	+0.6	+0.5
Brazil	2.48	1.81	3.46	16.65	14,571.2	-5.8	-6.6	-26.6
Chile	623	533	869	3.43**	5,384.4	-1.3	+10.6	+1.8
Colombia	2,305	2,137	3,215	12.64	873.6	nil	+22.6	+18.9
Mexico	9.08	9.87	12.7	8.91	6,455.2	-5.1	+14.2	+20.8
Peru	3.52	3.49	4.9	9.56	1,350.3	-2.2	+11.7	+12.0
Venezuela	718	680	1,001	11.67	7,329.8	-1.8	+7.9	+5.2
Egypt	3.87	3.47	5.41	9.07	6,074.4	-3.4	-20.7	-20.4
Israel	4.15	4.11	5.79	4.99	400.0	-2.6	-19.1	-21.2
South Africa	8.10	6.93	11.3	9.63	9,169.1	-1.0	+10.1	+2.9
Turkey	1,268,500	618,690	1,769,811	60.00	10,822.4	-4.1	+14.7	-39.4
Czech Republic	39.9	38.0	55.6	5.10	425.5	-1.9	-11.1	-16.1
Hungary	289	275	404	10.91	6,671.3	-1.2	-15.0	-17.1
Poland	3.99	4.40	5.57	17.01	13,920.5	-4.3	-22.0	-19.3
Russia	29.1	28.2	40.7	25.00	219.4†	+4.4	+55.8	+53.1
EMF (MSCI)‡	1.00	1.00	1.40	na	319.3	-3.5	na	-4.3
EMBI+§	1.00	1.00	1.40	na	214.7	-1.4	na	+6.3

**Inflation adjusted. †In dollar terms. ‡Emerging Markets Free. §J.P. Morgan Chase's Emerging Markets Bond Index Plus.

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Economy

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	% change on year earlier						Latest 12 months, $bn				Foreign reserves* $bn, latest	
	GDP		Industrial production		Consumer prices		Trade balance		Current account			
China	+ 8.1	Q1	+10.2	May	+ 1.7	May	+21.1	May	+20.5	2000	178.0	Feb
Hong Kong	+ 2.5	Q1	− 0.2	Q4	− 1.4	Apr	−11.9	Apr	+ 8.8	Q4	114.7	May
India	+ 5.7	Q3	+ 2.7	Apr	+ 2.3	Apr	− 5.7	Apr	− 5.4	Q4	39.9	Apr
Indonesia	+ 4.0	Q1	+ 4.5	Q4	+10.8	May	+26.1	Apr	+ 5.5	Q3	22.1	Apr
Malaysia	+ 3.2	Q1	− 0.3	Apr	+ 1.6	May	+15.6	Apr	+ 8.4	Q4	26.8	Mar
Philippines	+ 2.5	Q1	− 2.0	Mar	+ 6.5	May	+ 6.7	Apr	+ 9.5	Feb	12.8	Mar
Singapore	+ 4.5	Q1	− 0.8	Apr	+ 2.0	Apr	+ 4.9	May	+21.8	Q1	77.6	Mar
South Korea	+ 3.7	Q1	+ 5.7	Apr	+ 5.4	May	+14.9	May	+14.0	Apr	93.4	May
Taiwan	+ 1.1	Q1	− 5.9	Apr	− 0.2	May	+11.4	May	+12.0	Q1	110.6	Mar
Thailand	+ 1.8	Q1	+ 0.7	Apr	+ 2.8	May	+ 3.1	Apr	+ 6.9	Apr	31.5	Apr
Argentina	− 2.1	Q1	+ 8.6	Apr	+ 0.2	May	+ 1.6	Apr	− 9.4	Q4	20.5	Apr
Brazil	+ 3.8	Q1	+ 6.1	Apr	+ 7.7	May	+34.7	Apr	−26.6	Apr	34.1	Mar
Chile	+ 3.3	Q1	+ 3.1	Apr	+ 3.7	May	+ 1.5	Apr	− 1.4	Q1	14.3	Apr
Colombia	+ 1.8	Q1	+ 4.0	Apr	+ 7.9	May	+ 0.6	Mar	− 0.1	Q4	9.7	Apr
Mexico	+ 1.9	Q1	− 3.2	Apr	+ 7.0	May	− 9.5	Apr	−17.8	Q1	40.3	Apr
Peru	− 0.9	Apr	− 6.3	Mar	+ 2.6	May	− 0.4	Apr	− 1.7	Q4	8.2	Mar
Venezuela	+ 3.5	Q1	na		+12.6	May	+17.5	Nov	+12.5	Q1	11.5	Apr
Egypt	+ 6.5	2000†	+ 9.4	2000†	+ 2.4	Mar	−10.4	Q4	− 0.8	Q4	12.9	Feb
Israel	+ 1.8	Q1	− 1.0	Mar	+ 0.7	May	− 7.5	May	− 0.7	Q3	22.2	May
South Africa	+ 2.7	Q1	+ 7.3	Apr	+ 6.4	May	+ 3.7	Apr	− 0.5	Q4	6.1	Apr
Turkey	+ 8.3	Q4	−10.5	Apr	+52.4	May	−26.3	Mar	− 8.1	Mar	18.5	Apr
Czech Republic	+ 3.9	Q4	+11.4	Apr	+ 5.0	May	− 3.6	Apr	− 2.7	Q1	12.6	May
Hungary	+ 4.4	Q1	+ 9.4	Apr	+10.8	May	− 2.3	Apr	− 1.7	Apr	11.3	Apr
Poland	+ 2.4	Q4	− 1.0	May	+ 6.9	May	−10.0	Apr	− 8.8	Apr	27.1	Mar
Russia	+ 6.8	Q4	+ 5.2	Apr	+25.0	May	+60.5	Apr	+45.9	Q1	25.9	Mar
MORE COUNTRIES	Data for the countries below are not provided in printed editions of *The Economist*											
Pakistan	+ 5.6	2000†	+ 7.9	Oct	+ 3.9	Apr	− 1.7	May	− 2.5	1999	1.2	Apr
Saudi Arabia	− 0.8	1999	na		− 0.2	Mar	+24.9	1999	+ 0.4	1999	16.9	Mar

*Excluding gold, except Singapore; IMF definition. †Year ending June.

Text refers only to the first 25 countries listed

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Investment in Asia

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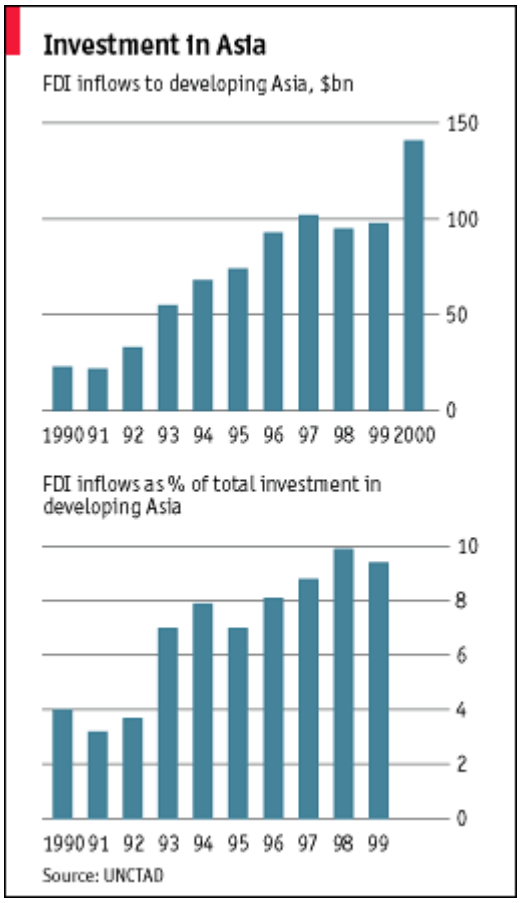
Developing countries in Asia are becoming a more powerful magnet for foreign direct investment (FDI). According to preliminary estimates by UNCTAD, FDI into developing Asia reached a record level of $141 billion in 2000, a 44% increase over 1999. Most of this rise was due to an inward-investment boom in Hong Kong. FDI flows into China were unchanged, at just over $40 billion.



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